

# EXHIBIT 3



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**Lambourne**

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(54) **ZONE SCENE MANAGEMENT**

(56) **References Cited**

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U.S. PATENT DOCUMENTS

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3,956,591 A 5/1976 Gates, Jr.  
4,105,974 A 8/1978 Rogers  
(Continued)

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FOREIGN PATENT DOCUMENTS

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CA 2320451 A1 3/2001  
CN 1598767 A 3/2005  
(Continued)

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OTHER PUBLICATIONS

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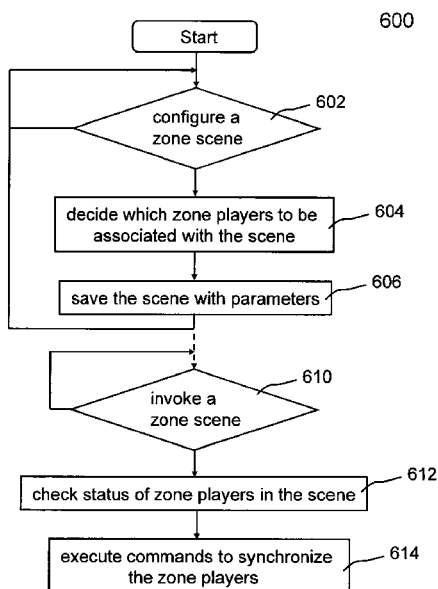
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(57) **ABSTRACT**

An example computing device in a media playback system receives a first request to create a first zone scene including a first preconfigured grouping of zones including a first zone and a second zone, and based on the first request, causes creation and storage of the first zone scene. The computing device receives a second request to create a second zone scene including a second preconfigured grouping of zones including the first zone and a third zone, and based on the second request, causes creation and storage of the second zone scene. While displaying a representation of the first zone scene and a representation of the second zone scene, the computing devices receives a third request to invoke the first zone scene, and based on the third request, causes the first zone scene to be invoked such that the first zone and the second zone become configured for synchronous playback of media.

**20 Claims, 13 Drawing Sheets**



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See application file for complete search history.
- (56) **References Cited**  
U.S. PATENT DOCUMENTS
- |           |   |         |                   |
|-----------|---|---------|-------------------|
| D260,764  | S | 9/1981  | Castagna et al.   |
| 4,296,278 | A | 10/1981 | Cullison et al.   |
| 4,306,114 | A | 12/1981 | Callahan          |
| 4,382,158 | A | 5/1983  | Ohshita et al.    |
| 4,509,211 | A | 4/1985  | Robbins           |
| D279,779  | S | 7/1985  | Taylor            |
| 4,530,091 | A | 7/1985  | Crockett          |
| 4,696,037 | A | 9/1987  | Fierens           |
| 4,701,629 | A | 10/1987 | Citroen           |
| 4,712,105 | A | 12/1987 | Kohler            |
| D293,671  | S | 1/1988  | Beaumont          |
| 4,731,814 | A | 3/1988  | Becker et al.     |
| 4,816,989 | A | 3/1989  | Finn et al.       |
| 4,824,059 | A | 4/1989  | Butler            |
| D301,037  | S | 5/1989  | Matsuda           |
| 4,845,751 | A | 7/1989  | Schwab            |
| D304,443  | S | 11/1989 | Grinyer et al.    |
| D313,023  | S | 12/1990 | Kolenda et al.    |
| D313,398  | S | 1/1991  | Gilchrist         |
| D313,600  | S | 1/1991  | Weber             |
| 4,994,908 | A | 2/1991  | Kuban et al.      |
| 4,995,778 | A | 2/1991  | Bruessel          |
| D320,598  | S | 10/1991 | Auerbach et al.   |
| D322,609  | S | 12/1991 | Patton            |
| 5,086,385 | A | 2/1992  | Launey et al.     |
| D326,450  | S | 5/1992  | Watanabe          |
| D327,060  | S | 6/1992  | Wachob et al.     |
| 5,151,922 | A | 9/1992  | Weiss             |
| 5,153,579 | A | 10/1992 | Fisch et al.      |
| D331,388  | S | 12/1992 | Dahnert et al.    |
| 5,182,552 | A | 1/1993  | Paynting          |
| D333,135  | S | 2/1993  | Wachob et al.     |
| 5,185,680 | A | 2/1993  | Kakubo            |
| 5,237,327 | A | 8/1993  | Saitoh et al.     |
| 5,239,458 | A | 8/1993  | Suzuki            |
| 5,272,757 | A | 12/1993 | Scotfield et al.  |
| 5,299,266 | A | 3/1994  | Lumsden           |
| D350,531  | S | 9/1994  | Tsuji             |
| D350,962  | S | 9/1994  | Reardon et al.    |
| 5,361,381 | A | 11/1994 | Short             |
| 5,372,441 | A | 12/1994 | Louis             |
| D354,059  | S | 1/1995  | Hendricks         |
| D354,751  | S | 1/1995  | Hersh et al.      |
| D356,093  | S | 3/1995  | McCauley et al.   |
| D356,312  | S | 3/1995  | Althans           |
| D357,024  | S | 4/1995  | Tokiyama et al.   |
| 5,406,634 | A | 4/1995  | Anderson et al.   |
| 5,430,485 | A | 7/1995  | Lankford et al.   |
| 5,440,644 | A | 8/1995  | Farinelli et al.  |
| D362,446  | S | 9/1995  | Gasiorek et al.   |
| 5,457,448 | A | 10/1995 | Totsuka et al.    |
| D363,933  | S | 11/1995 | Starck            |
| 5,467,342 | A | 11/1995 | Logston et al.    |
| D364,877  | S | 12/1995 | Tokiyama et al.   |
| D364,878  | S | 12/1995 | Green et al.      |
| D365,102  | S | 12/1995 | Gioscia           |
| D366,044  | S | 1/1996  | Hara et al.       |
| 5,481,251 | A | 1/1996  | Buys et al.       |
| 5,491,839 | A | 2/1996  | Schotz            |
| 5,515,345 | A | 5/1996  | Barreira et al.   |
| 5,519,641 | A | 5/1996  | Beers et al.      |
| 5,533,021 | A | 7/1996  | Branstad et al.   |
| D372,716  | S | 8/1996  | Thorne            |
| 5,553,147 | A | 9/1996  | Pineau            |
| 5,553,222 | A | 9/1996  | Milne et al.      |
| 5,553,314 | A | 9/1996  | Grube et al.      |
| D377,651  | S | 1/1997  | Biasotti et al.   |
| 5,596,696 | A | 1/1997  | Tindell et al.    |
| 5,602,992 | A | 2/1997  | Danneels          |
| 5,623,483 | A | 4/1997  | Agrawal et al.    |
| 5,625,350 | A | 4/1997  | Fukatsu et al.    |
| D379,816  | S | 6/1997  | Laituri et al.    |
| 5,640,388 | A | 6/1997  | Woodhead et al.   |
| D380,752  | S | 7/1997  | Hanson            |
| 5,652,749 | A | 7/1997  | Davenport et al.  |
| D382,271  | S | 8/1997  | Akwivu            |
| 5,661,665 | A | 8/1997  | Glass et al.      |
| 5,668,884 | A | 9/1997  | Clair, Jr. et al. |
| 5,673,323 | A | 9/1997  | Schotz et al.     |
| D384,940  | S | 10/1997 | Kono et al.       |
| D387,352  | S | 12/1997 | Kaneko et al.     |
| 5,696,896 | A | 12/1997 | Badovinatz et al. |
| D388,792  | S | 1/1998  | Nykerk            |
| D389,143  | S | 1/1998  | Wicks             |
| D392,641  | S | 3/1998  | Fenner            |
| 5,726,989 | A | 3/1998  | Dokic             |
| D393,628  | S | 4/1998  | Ledbetter et al.  |
| 5,740,235 | A | 4/1998  | Lester et al.     |
| 5,742,623 | A | 4/1998  | Nuber et al.      |
| D394,659  | S | 5/1998  | Biasotti et al.   |
| 5,751,819 | A | 5/1998  | Dorough           |
| 5,761,320 | A | 6/1998  | Farinelli et al.  |
| 5,774,016 | A | 6/1998  | Ketterer          |
| D395,889  | S | 7/1998  | Gerba et al.      |
| 5,787,249 | A | 7/1998  | Badovinatz et al. |
| 5,790,543 | A | 8/1998  | Cloutier          |
| D397,996  | S | 9/1998  | Smith             |
| 5,808,662 | A | 9/1998  | Kinney et al.     |
| 5,812,201 | A | 9/1998  | Yoo               |
| 5,815,689 | A | 9/1998  | Shaw et al.       |
| 5,818,948 | A | 10/1998 | Gulick            |
| D401,587  | S | 11/1998 | Rudolph           |
| 5,832,024 | A | 11/1998 | Schotz et al.     |
| 5,848,152 | A | 12/1998 | Slipy et al.      |
| 5,852,722 | A | 12/1998 | Hamilton          |
| D404,741  | S | 1/1999  | Schumaker et al.  |
| D405,071  | S | 2/1999  | Gambara           |
| 5,867,691 | A | 2/1999  | Shiraishi         |
| 5,875,233 | A | 2/1999  | Cox               |
| 5,875,354 | A | 2/1999  | Charlton et al.   |
| D406,847  | S | 3/1999  | Gerba et al.      |

## US 10,469,966 B2

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(56)

## References Cited

## U.S. PATENT DOCUMENTS

D407,071	S	3/1999	Keating	6,430,353	B1	8/2002	Honda et al.
5,887,143	A	3/1999	Saito et al.	6,442,443	B1	8/2002	Fujii et al.
5,905,768	A	5/1999	Maturi et al.	D462,339	S	9/2002	Allen et al.
D410,927	S	6/1999	Yamagishi	D462,340	S	9/2002	Allen et al.
5,910,991	A	6/1999	Farrar	D462,945	S	9/2002	Skulley
D412,337	S	7/1999	Hamano	6,449,642	B2	9/2002	Bourke-Dunphy et al.
5,923,869	A	7/1999	Kashiwagi et al.	6,449,653	B2	9/2002	Klemets et al.
5,923,902	A	7/1999	Inagaki	6,456,783	B1	9/2002	Ando et al.
5,946,343	A	8/1999	Schotz et al.	6,463,474	B1	10/2002	Fuh et al.
5,956,025	A	9/1999	Goulden et al.	6,466,832	B1	10/2002	Zuqert et al.
5,956,088	A	9/1999	Shen et al.	6,469,633	B1	10/2002	Wachter et al.
5,960,006	A	9/1999	Maturi et al.	D466,108	S	11/2002	Glodava et al.
D415,496	S	10/1999	Gerba et al.	6,487,296	B1	11/2002	Allen et al.
D416,021	S	11/1999	Godette et al.	6,493,832	B1	12/2002	Itakura et al.
5,984,512	A	11/1999	Jones et al.	D468,297	S	1/2003	Ikeda
5,987,611	A	11/1999	Freund	6,522,886	B1	2/2003	Youngs et al.
5,990,884	A	11/1999	Douma et al.	6,526,325	B1	2/2003	Sussman et al.
5,991,307	A	11/1999	Komuro et al.	6,535,121	B2	3/2003	Matheny et al.
5,999,906	A	12/1999	Merces et al.	D474,763	S	5/2003	Tozaki et al.
6,009,457	A	12/1999	Moller	D475,993	S	6/2003	Meyer
6,018,376	A	1/2000	Nakatani	D476,643	S	7/2003	Yamagishi
D420,006	S	2/2000	Tonino	D477,310	S	7/2003	Moransais
6,026,150	A	2/2000	Frank et al.	6,587,127	B1	7/2003	Leeke et al.
6,029,196	A	2/2000	Lenz	6,598,172	B1	7/2003	Vandeusen et al.
6,031,818	A	2/2000	Lo et al.	D478,051	S	8/2003	Sagawa
6,032,202	A	2/2000	Lea et al.	D478,069	S	8/2003	Beck et al.
6,038,614	A	3/2000	Chan et al.	D478,896	S	8/2003	Summers
6,046,550	A	4/2000	Ference et al.	6,604,023	B1	8/2003	Brown et al.
6,061,457	A	5/2000	Stockhamer	6,611,537	B1	8/2003	Edens et al.
6,078,725	A	6/2000	Tanaka	D479,520	S	9/2003	De
6,081,266	A	6/2000	Sciammarella	D481,056	S	10/2003	Kawasaki et al.
6,088,063	A	7/2000	Shiba	6,631,410	B1	10/2003	Kowalski et al.
D429,246	S	8/2000	Holma	6,636,269	B1	10/2003	Baldwin
D430,143	S	8/2000	Renk	6,653,899	B2	11/2003	Organvitez et al.
6,101,195	A	8/2000	Lyons et al.	6,654,720	B1	11/2003	Graham et al.
6,108,485	A	8/2000	Kim	6,654,956	B1	11/2003	Trinh et al.
6,108,686	A	8/2000	Williams, Jr.	6,658,091	B1	12/2003	Naidoo et al.
6,122,668	A	9/2000	Teng et al.	6,674,803	B1	1/2004	Kesselring
D431,552	S	10/2000	Backs et al.	6,684,060	B1	1/2004	Curtin
D432,525	S	10/2000	Beecroft	D486,145	S	2/2004	Kaminski et al.
6,127,941	A	10/2000	Van Ryzin	6,687,664	B1	2/2004	Sussman et al.
6,128,318	A	10/2000	Sato	6,704,421	B1	3/2004	Kitamura
6,148,205	A	11/2000	Cotton	6,741,961	B2	5/2004	Lim
6,157,957	A	12/2000	Berthaud	D491,925	S	6/2004	Griesau et al.
6,163,647	A	12/2000	Terashima et al.	6,757,517	B2	6/2004	Chang et al.
6,169,725	B1	1/2001	Gibbs et al.	D493,148	S	7/2004	Shibata et al.
6,175,872	B1	1/2001	Neumann et al.	6,763,274	B1	7/2004	Gilbert
6,181,383	B1	1/2001	Fox et al.	D495,333	S	8/2004	Borsboom
6,185,737	B1	2/2001	Northcutt et al.	6,778,073	B2	8/2004	Lutter et al.
6,195,435	B1	2/2001	Kitamura	6,778,493	B1	8/2004	Ishii
6,195,436	B1	2/2001	Scibora et al.	6,778,869	B2	8/2004	Champion
6,199,169	B1	3/2001	Voth	D496,003	S	9/2004	Spira
6,212,282	B1	4/2001	Mershon	D496,005	S	9/2004	Wang
6,246,701	B1	6/2001	Slattery	D496,335	S	9/2004	Spira
6,253,293	B1	6/2001	Rao et al.	D497,363	S	10/2004	Olson et al.
D444,475	S	7/2001	Levey et al.	6,803,964	B1	10/2004	Post et al.
6,255,961	B1	7/2001	Van et al.	6,809,635	B1	10/2004	Kaaresoja
6,256,554	B1	7/2001	Dilorenzo	D499,086	S	11/2004	Polito
6,269,406	B1	7/2001	Dutcher et al.	6,816,510	B1	11/2004	Banerjee
6,301,012	B1	10/2001	White et al.	6,816,818	B2	11/2004	Wolf et al.
6,308,207	B1	10/2001	Tseng et al.	6,823,225	B1	11/2004	Sass
6,310,652	B1	10/2001	Li et al.	6,826,283	B1	11/2004	Wheeler et al.
6,313,879	B1	11/2001	Kubo et al.	D499,395	S	12/2004	Hsu
6,321,252	B1	11/2001	Bhola et al.	D499,718	S	12/2004	Chen
6,324,586	B1	11/2001	Johnson	D500,015	S	12/2004	Gubbe
D452,520	S	12/2001	Gotham et al.	6,836,788	B2	12/2004	Kim et al.
6,332,147	B1	12/2001	Moran et al.	6,839,752	B1	1/2005	Miller et al.
6,343,028	B1	1/2002	Kuwaoka	D501,477	S	2/2005	Hall
6,349,285	B1	2/2002	Liu et al.	6,859,460	B1	2/2005	Chen
6,349,339	B1	2/2002	Williams	6,859,538	B1	2/2005	Voltz
6,351,821	B1	2/2002	Voth	6,873,862	B2	3/2005	Reshefsky
6,353,172	B1	3/2002	Fay et al.	6,882,335	B2	4/2005	Saarinan
6,356,871	B1	3/2002	Hemkumar et al.	D504,872	S	5/2005	Uehara et al.
6,404,811	B1	6/2002	Cvetko et al.	D504,885	S	5/2005	Zhang et al.
6,418,150	B1	7/2002	Staats	6,889,207	B2	5/2005	Slemmer et al.
				6,898,642	B2	5/2005	Chafle et al.
				6,901,439	B1	5/2005	Bonasia et al.
				D506,463	S	6/2005	Daniels
				6,907,458	B2	6/2005	Tomassetti et al.

## US 10,469,966 B2

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(56)

## References Cited

## U.S. PATENT DOCUMENTS

6,912,610 B2	6/2005	Spencer	7,333,519 B2	2/2008	Sullivan et al.
6,915,347 B2	7/2005	Hanko et al.	7,346,332 B2	3/2008	McCarty et al.
6,916,980 B2	7/2005	Ishida et al.	7,356,011 B1	4/2008	Waters et al.
6,917,592 B1	7/2005	Ramankutty et al.	7,359,006 B1	4/2008	Xiang et al.
6,919,771 B2	7/2005	Nakajima	7,366,206 B2	4/2008	Lockridge et al.
6,920,373 B2	7/2005	Xi et al.	7,372,846 B2	5/2008	Zwack
6,931,134 B1	8/2005	Waller, Jr. et al.	7,391,791 B2	6/2008	Balassanian et al.
6,931,557 B2	8/2005	Togawa	7,392,102 B2	6/2008	Sullivan et al.
6,934,766 B1	8/2005	Russell	7,392,481 B2	6/2008	Gewickey et al.
6,937,988 B1	8/2005	Hemkumar et al.	7,400,644 B2	7/2008	Sakamoto et al.
6,970,482 B2	11/2005	Kim	7,412,499 B2	8/2008	Chang et al.
6,985,694 B1	1/2006	De Bonet et al.	7,424,267 B2	9/2008	Eisenbach
6,987,767 B2	1/2006	Saito	7,428,310 B2	9/2008	Park
6,987,947 B2	1/2006	Richenstein et al.	7,430,181 B1	9/2008	Hong
D515,072 S	2/2006	Lee	7,457,948 B1	11/2008	Bilicksa et al.
D515,557 S	2/2006	Okuley	7,472,058 B2	12/2008	Tseng et al.
7,007,106 B1	2/2006	Flood et al.	7,474,677 B2	1/2009	Trott
7,020,791 B1	3/2006	Aweya et al.	7,483,538 B2	1/2009	McCarty et al.
D518,475 S	4/2006	Yang et al.	7,483,540 B2	1/2009	Rabinowitz et al.
7,043,477 B2	5/2006	Mercer et al.	7,483,958 B1	1/2009	Elabbady et al.
7,043,651 B2	5/2006	Aweya et al.	7,490,044 B2	2/2009	Kulkarni
7,046,677 B2	5/2006	Monta et al.	7,492,912 B2	2/2009	Chung et al.
7,047,308 B2	5/2006	Deshpande	7,505,889 B2	3/2009	Salmonsens et al.
7,054,888 B2	5/2006	Lachapelle et al.	7,509,181 B2	3/2009	Champion
7,058,889 B2	6/2006	Trovato et al.	7,519,188 B2	4/2009	Berardi et al.
7,068,596 B1	6/2006	Mou	7,519,667 B1	4/2009	Capps
D524,296 S	7/2006	Kita	7,539,551 B2	5/2009	Komura et al.
7,072,477 B1	7/2006	Kincaid	7,548,744 B2	6/2009	Oesterling et al.
D527,375 S	8/2006	Flora et al.	7,548,851 B1	6/2009	Lau et al.
7,092,528 B2	8/2006	Patrick et al.	7,558,224 B1	7/2009	Surazski et al.
7,092,694 B2	8/2006	Griep et al.	7,558,635 B1	7/2009	Thiel et al.
7,096,169 B2	8/2006	Crutchfield et al.	7,561,932 B1	7/2009	Holmes et al.
7,113,999 B2	9/2006	Pestoni et al.	7,571,014 B1	8/2009	Lambourne et al.
7,115,017 B1	10/2006	Laursen et al.	7,574,274 B2	8/2009	Holmes
7,120,168 B2	10/2006	Zimmermann	7,599,685 B2	10/2009	Goldberg et al.
7,130,316 B2	10/2006	Kovacevic	7,606,174 B2	10/2009	Ochi et al.
7,130,368 B1	10/2006	Aweya et al.	7,620,468 B2	11/2009	Shimizu
7,130,608 B2	10/2006	Hollstrom et al.	7,626,952 B2	12/2009	Slemmer et al.
7,130,616 B2	10/2006	Janik	7,627,825 B2	12/2009	Kakuda
7,136,934 B2	11/2006	Carter et al.	7,630,500 B1	12/2009	Beckman et al.
7,139,981 B2	11/2006	Mayer et al.	7,630,501 B2	12/2009	Blank et al.
7,143,141 B1	11/2006	Morgan et al.	7,631,119 B2	12/2009	Moore et al.
7,143,939 B2	12/2006	Henzerling	7,643,894 B2	1/2010	Braithwaite et al.
7,146,260 B2	12/2006	Preston et al.	7,653,344 B1	1/2010	Feldman et al.
7,158,488 B2	1/2007	Fujimori	7,657,224 B2	2/2010	Goldberg et al.
7,161,939 B2	1/2007	Israel et al.	7,657,644 B1	2/2010	Zheng
7,162,315 B2	1/2007	Gilbert	7,657,910 B1	2/2010	McAulay et al.
7,171,010 B2	1/2007	Martin et al.	7,665,115 B2	2/2010	Gallo et al.
7,185,090 B2	2/2007	Kowalski et al.	7,668,990 B2	2/2010	Krzyzanowski et al.
7,187,947 B1	3/2007	White et al.	7,669,113 B1	2/2010	Moore et al.
7,197,148 B2	3/2007	Nourse et al.	7,669,219 B2	2/2010	Scott, III
7,206,367 B1	4/2007	Moore et al.	7,672,470 B2	3/2010	Lee
7,206,618 B2	4/2007	Latto et al.	7,675,943 B2	3/2010	Mosig et al.
7,206,967 B1	4/2007	Marti et al.	7,676,044 B2	3/2010	Sasaki et al.
7,209,795 B2	4/2007	Sullivan et al.	7,676,142 B1	3/2010	Hung
7,218,708 B2	5/2007	Berezowski	7,688,306 B2	3/2010	Wehrenberg et al.
7,236,739 B2	6/2007	Chang et al.	7,689,304 B2	3/2010	Sasaki
7,236,773 B2	6/2007	Thomas	7,689,305 B2	3/2010	Kreifeldt et al.
7,257,398 B1	8/2007	Ukita et al.	7,702,279 B2	4/2010	Ko et al.
7,260,616 B1	8/2007	Cook	7,702,403 B1	4/2010	Gladwin et al.
7,263,110 B2	8/2007	Fujishiro	7,710,941 B2	5/2010	Rietschel et al.
7,277,547 B1	10/2007	Delker et al.	7,711,774 B1	5/2010	Rothschild
7,286,652 B1	10/2007	Azriel et al.	7,720,096 B2	5/2010	Klemets
7,289,631 B2	10/2007	Ishidoshiro	7,721,032 B2	5/2010	Bushell et al.
7,293,060 B2	11/2007	Komsi	7,742,740 B2	6/2010	Goldberg et al.
7,295,548 B2	11/2007	Blank et al.	7,742,832 B1	6/2010	Feldman et al.
7,302,468 B2	11/2007	Wijeratne	7,743,009 B2	6/2010	Hangartner et al.
7,305,694 B2	12/2007	Commons et al.	7,746,906 B2	6/2010	Jinzaki et al.
7,308,188 B2	12/2007	Namatame	7,761,176 B2	7/2010	Ben-Yaacov et al.
7,310,334 B1	12/2007	Fitzgerald et al.	7,765,315 B2	7/2010	Batson et al.
7,312,785 B2	12/2007	Tsuk et al.	RE41,608 E	8/2010	Blair et al.
7,313,593 B1	12/2007	Pulito et al.	7,792,311 B1	9/2010	Holmgren et al.
7,319,764 B1	1/2008	Reid et al.	7,793,206 B2	9/2010	Lim et al.
7,324,857 B2	1/2008	Goddard	7,804,972 B2	9/2010	Melanson
7,330,875 B1	2/2008	Parasnis et al.	7,805,210 B2	9/2010	Cucos et al.
			7,817,960 B2	10/2010	Tan et al.
			7,827,259 B2	11/2010	Heller et al.
			7,831,054 B2	11/2010	Ball et al.
			7,835,689 B2	11/2010	Goldberg et al.

## US 10,469,966 B2

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(56)

## References Cited

## U.S. PATENT DOCUMENTS

7,849,181 B2	12/2010	Slemmer et al.	8,265,310 B2	9/2012	Berardi et al.
7,853,341 B2	12/2010	McCarty et al.	8,279,709 B2	10/2012	Choisel et al.
7,865,137 B2	1/2011	Goldberg et al.	8,281,001 B2	10/2012	Busam et al.
7,882,234 B2	2/2011	Watanabe et al.	8,285,404 B1	10/2012	Kekki
7,885,622 B2	2/2011	Krampf et al.	8,290,185 B2	10/2012	Kim
7,907,819 B2	3/2011	Ando et al.	8,290,603 B1	10/2012	Lambourne et al.
7,916,877 B2	3/2011	Goldberg et al.	8,300,845 B2	10/2012	Zurek et al.
7,917,082 B2	3/2011	Goldberg et al.	8,306,235 B2	11/2012	Mahowald
7,933,418 B2	4/2011	Morishima	8,311,226 B2	11/2012	Lorgeoux et al.
7,934,239 B1	4/2011	Dagman	8,315,555 B2	11/2012	Ko et al.
7,945,636 B2	5/2011	Nelson et al.	8,316,147 B2	11/2012	Batson et al.
7,945,708 B2	5/2011	Ohkita	8,325,931 B2	12/2012	Howard et al.
7,958,441 B2	6/2011	Heller et al.	8,325,935 B2	12/2012	Rutschman
7,962,482 B2	6/2011	Handman et al.	8,331,585 B2	12/2012	Hagen et al.
7,966,388 B1	6/2011	Pugaczewski et al.	8,340,330 B2	12/2012	Yoon et al.
7,987,294 B2	7/2011	Bryce et al.	8,345,709 B2	1/2013	Nitzpon et al.
7,995,732 B2	8/2011	Koch et al.	8,364,295 B2	1/2013	Beckmann et al.
7,996,566 B1	8/2011	Sylvain et al.	8,370,678 B2	2/2013	Millington et al.
7,996,588 B2	8/2011	Subbiah et al.	8,374,595 B2	2/2013	Chien et al.
8,014,423 B2	9/2011	Thaler et al.	8,391,501 B2	3/2013	Khawand et al.
8,015,306 B2	9/2011	Bowman	8,407,623 B2	3/2013	Kerr et al.
8,020,023 B2	9/2011	Millington et al.	8,411,883 B2	4/2013	Matsumoto
8,023,663 B2	9/2011	Goldberg	8,423,659 B2	4/2013	Millington
8,028,038 B2	9/2011	Weel	8,423,893 B2	4/2013	Ramsay et al.
8,028,323 B2	9/2011	Weel	8,432,851 B2	4/2013	Xu et al.
8,041,062 B2	10/2011	Cohen et al.	8,433,076 B2	4/2013	Zurek et al.
8,045,721 B2	10/2011	Burgan et al.	8,442,239 B2	5/2013	Bruelle-Drews et al.
8,045,952 B2	10/2011	Qureshey et al.	8,452,020 B2	5/2013	Gregg et al.
8,050,203 B2	11/2011	Jacobsen et al.	8,457,334 B2	6/2013	Yoon et al.
8,050,652 B2	11/2011	Qureshey et al.	8,463,184 B2	6/2013	Dua
8,054,987 B2	11/2011	Seydoux	8,463,875 B2	6/2013	Katz et al.
8,055,364 B2	11/2011	Champion	8,473,844 B2	6/2013	Kreifeldt et al.
8,063,698 B2	11/2011	Howard	8,477,958 B2	7/2013	Moeller et al.
8,074,253 B1	12/2011	Nathan	8,483,853 B1	7/2013	Lambourne et al.
8,086,287 B2	12/2011	Mooney et al.	8,498,726 B2	7/2013	Kim et al.
8,086,752 B2	12/2011	Millington et al.	8,509,211 B2	8/2013	Trotter et al.
8,090,317 B2	1/2012	Burge et al.	8,520,870 B2	8/2013	Sato et al.
8,103,009 B2	1/2012	McCarty et al.	8,565,455 B2	10/2013	Worrell et al.
8,111,132 B2	2/2012	Allen et al.	8,577,045 B2	11/2013	Gibbs
8,112,032 B2	2/2012	Ko et al.	8,577,048 B2	11/2013	Chaikin et al.
8,116,476 B2	2/2012	Inohara	8,588,432 B1	11/2013	Simon
8,126,172 B2	2/2012	Horbach et al.	8,588,949 B2	11/2013	Lambourne et al.
8,131,389 B1	3/2012	Hardwick et al.	8,600,075 B2	12/2013	Lim
8,131,390 B2	3/2012	Braithwaite et al.	8,600,084 B1	12/2013	Garrett
8,135,141 B2	3/2012	Shiba	8,611,559 B2	12/2013	Sanders
8,139,774 B2	3/2012	Berardi et al.	8,615,091 B2	12/2013	Terwal
8,144,883 B2	3/2012	Pdersen et al.	8,620,006 B2	12/2013	Berardi et al.
8,148,622 B2	4/2012	Rothkopf et al.	8,639,830 B2	1/2014	Bowman
8,150,079 B2	4/2012	Maeda et al.	8,654,995 B2	2/2014	Silber et al.
8,160,281 B2	4/2012	Kim et al.	8,672,744 B1	3/2014	Gronkowski et al.
8,169,938 B2	5/2012	Duchscher et al.	8,683,009 B2	3/2014	Ng et al.
8,170,222 B2	5/2012	Dunko	8,700,730 B2	4/2014	Rowe
8,170,260 B2	5/2012	Reining et al.	8,731,206 B1	5/2014	Park
8,175,292 B2	5/2012	Aylward et al.	8,750,282 B2	6/2014	Gelter et al.
8,175,297 B1	5/2012	Ho et al.	8,751,026 B2	6/2014	Sato et al.
8,185,674 B2	5/2012	Moore et al.	8,762,565 B2	6/2014	Togashi et al.
8,189,824 B2	5/2012	Strauss et al.	8,775,546 B2	7/2014	Millington
8,194,874 B2	6/2012	Starobin et al.	8,788,080 B1	7/2014	Kallai et al.
8,204,890 B1	6/2012	Gogan et al.	8,818,538 B2	8/2014	Sakata
8,208,653 B2	6/2012	Eo et al.	8,819,554 B2	8/2014	Basso et al.
8,214,447 B2	7/2012	Deslippe et al.	8,843,224 B2	9/2014	Holmgren et al.
8,214,740 B2	7/2012	Johnson	8,843,228 B2	9/2014	Lambourne
8,214,873 B2	7/2012	Weel	8,843,586 B2	9/2014	Pantos et al.
8,218,790 B2	7/2012	Bull et al.	8,855,319 B2	10/2014	Liu et al.
8,229,125 B2	7/2012	Short	8,861,739 B2	10/2014	Ojanpera
8,230,099 B2	7/2012	Weel	8,879,761 B2	11/2014	Johnson et al.
8,233,029 B2	7/2012	Yoshida et al.	8,885,851 B2	11/2014	Westenbroek
8,233,632 B1	7/2012	MacDonald et al.	8,886,347 B2	11/2014	Lambourne
8,233,635 B2	7/2012	Shiba	8,904,066 B2	12/2014	Moore et al.
8,233,648 B2	7/2012	Sorek et al.	8,914,559 B2	12/2014	Kalayjian et al.
8,234,395 B2	7/2012	Millington et al.	8,917,877 B2	12/2014	Haaff et al.
8,238,578 B2	8/2012	Aylward	8,923,997 B2	12/2014	Kallai et al.
8,239,559 B2	8/2012	Rajapakse	8,930,006 B2	1/2015	Haatainen
8,239,748 B1	8/2012	Moore et al.	8,934,647 B2	1/2015	Joyce et al.
8,243,961 B1	8/2012	Morrill	8,934,655 B2	1/2015	Breen et al.
			8,942,252 B2	1/2015	Balassanian et al.
			8,942,395 B2	1/2015	Lissaman et al.
			8,954,177 B2	2/2015	Sanders
			8,965,544 B2	2/2015	Ramsay



## US 10,469,966 B2

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(56)

## References Cited

## U.S. PATENT DOCUMENTS

8,965,546	B2	2/2015	Visser et al.	2003/0002689	A1	1/2003	Folio
8,966,394	B2	2/2015	Gates et al.	2003/0008616	A1	1/2003	Anderson
8,977,974	B2	3/2015	Kraut	2003/0014486	A1	1/2003	May
8,984,442	B2	3/2015	Pirnack et al.	2003/0018797	A1	1/2003	Dunning et al.
9,020,153	B2	4/2015	Britt, Jr.	2003/0020763	A1	1/2003	Mayer et al.
9,042,556	B2	5/2015	Kallai et al.	2003/0023741	A1	1/2003	Tomassetti et al.
9,112,622	B2	8/2015	Miyata et al.	2003/0031333	A1	2/2003	Cohen et al.
9,137,602	B2	9/2015	Mayman et al.	2003/0035072	A1	2/2003	Hagg
9,160,965	B2	10/2015	Redmann et al.	2003/0035444	A1	2/2003	Zwack
9,195,258	B2	11/2015	Millington	2003/0041173	A1	2/2003	Hoyle
9,219,959	B2	12/2015	Kallai et al.	2003/0041174	A1	2/2003	Wen et al.
9,226,073	B2	12/2015	Ramos et al.	2003/0043856	A1	3/2003	Lakaniemi et al.
9,245,514	B2	1/2016	Donaldson	2003/0043924	A1	3/2003	Haddad et al.
9,325,286	B1	4/2016	Yang	2003/0055892	A1	3/2003	Huitema et al.
9,524,098	B2	12/2016	Griffiths et al.	2003/0061428	A1	3/2003	Garney et al.
2001/0001160	A1	5/2001	Shoff et al.	2003/0063755	A1	4/2003	Nourse et al.
2001/0009604	A1	7/2001	Ando et al.	2003/0066094	A1	4/2003	Van Der Schaar et al.
2001/0022823	A1	9/2001	Renaud	2003/0067437	A1	4/2003	McClintock et al.
2001/0027498	A1	10/2001	Van De Meulenhof et al.	2003/0073432	A1	4/2003	Meade
2001/0032188	A1	10/2001	Miyabe et al.	2003/0091322	A1	5/2003	Van
2001/0042107	A1	11/2001	Palm	2003/0097478	A1	5/2003	King
2001/0043456	A1	11/2001	Atkinson	2003/0099212	A1	5/2003	Anjum et al.
2001/0046235	A1	11/2001	Trevitt et al.	2003/0099221	A1	5/2003	Rhee
2001/0047377	A1	11/2001	Sincaglia et al.	2003/0101253	A1	5/2003	Saito et al.
2001/0050991	A1	12/2001	Eves	2003/0103088	A1	6/2003	Dresti et al.
2002/0002039	A1	1/2002	Qureshey et al.	2003/0110329	A1	6/2003	Higaki et al.
2002/0002562	A1	1/2002	Moran et al.	2003/0126211	A1	7/2003	Anttila et al.
2002/0002565	A1	1/2002	Ohyama	2003/0135822	A1	7/2003	Evans
2002/0003548	A1	1/2002	Krusche et al.	2003/0157951	A1	8/2003	Hasty
2002/0022453	A1	2/2002	Balog et al.	2003/0161479	A1	8/2003	Yang et al.
2002/0026442	A1	2/2002	Lipscomb et al.	2003/0167335	A1	9/2003	Alexander
2002/0034374	A1	3/2002	Barton	2003/0172123	A1	9/2003	Polan et al.
2002/0042844	A1	4/2002	Chiazzese	2003/0177889	A1	9/2003	Koseki et al.
2002/0049843	A1	4/2002	Barone et al.	2003/0179780	A1	9/2003	Walker et al.
2002/0062406	A1	5/2002	Chang et al.	2003/0185400	A1	10/2003	Yoshizawa et al.
2002/0065926	A1	5/2002	Hackney et al.	2003/0195964	A1	10/2003	Mane
2002/0067909	A1	6/2002	Iivonen	2003/0198254	A1	10/2003	Sullivan et al.
2002/0072816	A1	6/2002	Shdema et al.	2003/0198255	A1	10/2003	Sullivan et al.
2002/0072817	A1	6/2002	Champion	2003/0198257	A1	10/2003	Sullivan et al.
2002/0073228	A1	6/2002	Cognet et al.	2003/0200001	A1	10/2003	Goddard et al.
2002/0078161	A1	6/2002	Cheng	2003/0204273	A1	10/2003	Dinker et al.
2002/0078293	A1	6/2002	Kou et al.	2003/0204509	A1	10/2003	Dinker et al.
2002/0080783	A1	6/2002	Fujimori et al.	2003/0210796	A1	11/2003	McCarty et al.
2002/0090914	A1	7/2002	Kang et al.	2003/0212802	A1	11/2003	Rector et al.
2002/0093478	A1	7/2002	Yeh	2003/0219007	A1	11/2003	Barrack et al.
2002/0095460	A1	7/2002	Benson	2003/0227478	A1	12/2003	Chatfield
2002/0098878	A1	7/2002	Mooney et al.	2003/0229900	A1	12/2003	Reisman
2002/0101357	A1	8/2002	Gharapetian	2003/0231208	A1	12/2003	Hanon et al.
2002/0103635	A1	8/2002	Mesarovic	2003/0231871	A1	12/2003	Ushimaru
2002/0109710	A1	8/2002	Holtz et al.	2003/0235304	A1	12/2003	Evans et al.
2002/0112244	A1	8/2002	Liou et al.	2004/0001106	A1	1/2004	Deutscher et al.
2002/0114354	A1	8/2002	Sinha et al.	2004/0001484	A1	1/2004	Ozguner
2002/0114359	A1	8/2002	Ibaraki et al.	2004/0001591	A1	1/2004	Mani et al.
2002/0124097	A1	9/2002	Isely et al.	2004/0008852	A1	1/2004	Also et al.
2002/0129156	A1	9/2002	Yoshikawa	2004/0010727	A1	1/2004	Fujinami
2002/0131398	A1	9/2002	Taylor	2004/0012620	A1	1/2004	Buhler et al.
2002/0131761	A1	9/2002	Kawasaki et al.	2004/0014426	A1	1/2004	Moore
2002/0136335	A1	9/2002	Liou et al.	2004/0015252	A1	1/2004	Aiso et al.
2002/0137505	A1	9/2002	Eiche et al.	2004/0019497	A1	1/2004	Volk et al.
2002/0143547	A1	10/2002	Fay et al.	2004/0019807	A1	1/2004	Freund et al.
2002/0143998	A1	10/2002	Rajagopal et al.	2004/0019911	A1	1/2004	Gates et al.
2002/0150053	A1	10/2002	Gray et al.	2004/0023697	A1	2/2004	Komura
2002/0159596	A1	10/2002	Durand et al.	2004/0024478	A1	2/2004	Hans et al.
2002/0163361	A1	11/2002	Parkin	2004/0024925	A1	2/2004	Cypher et al.
2002/0165721	A1	11/2002	Chang et al.	2004/0027166	A1	2/2004	Mangum et al.
2002/0165921	A1	11/2002	Sapieyevski	2004/0032348	A1	2/2004	Lai et al.
2002/0168938	A1	11/2002	Chang	2004/0032421	A1	2/2004	Williamson et al.
2002/0173273	A1	11/2002	Spurgat et al.	2004/0037433	A1	2/2004	Chen
2002/0177411	A1	11/2002	Yajima et al.	2004/0041836	A1	3/2004	Zaner et al.
2002/0181355	A1	12/2002	Shikunami et al.	2004/0042629	A1	3/2004	Mellone et al.
2002/0184310	A1	12/2002	Traversat et al.	2004/0044742	A1	3/2004	Evron et al.
2002/0188762	A1	12/2002	Tomassetti et al.	2004/0048569	A1	3/2004	Kawamura
2002/0194309	A1	12/2002	Carter et al.	2004/0059842	A1	3/2004	Hanson et al.
2002/0196951	A1	12/2002	Tsai	2004/0059965	A1	3/2004	Marshall et al.
2003/0002609	A1	1/2003	Faller et al.	2004/0066736	A1	4/2004	Kroeger
				2004/0071299	A1	4/2004	Yoshino
				2004/0075767	A1	4/2004	Neuman et al.
				2004/0078383	A1	4/2004	Mercer et al.
				2004/0080671	A1	4/2004	Siemens et al.

## US 10,469,966 B2

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(56)

## References Cited

## U.S. PATENT DOCUMENTS

2004/0093096	A1	5/2004	Huang et al.	2005/0216556	A1	9/2005	Manion et al.
2004/0098754	A1	5/2004	Vella et al.	2005/0254505	A1	11/2005	Chang et al.
2004/0111473	A1	6/2004	Lysenko et al.	2005/0262217	A1	11/2005	Nonaka et al.
2004/0114771	A1	6/2004	Vaughan et al.	2005/0266798	A1	12/2005	Moloney et al.
2004/0117044	A1	6/2004	Konetski	2005/0266826	A1	12/2005	Vlad
2004/0117462	A1	6/2004	Bodin et al.	2005/0281255	A1	12/2005	Davies et al.
2004/0128701	A1	7/2004	Kaneko et al.	2005/0283820	A1	12/2005	Richards et al.
2004/0131192	A1	7/2004	Metcalf	2005/0288805	A1	12/2005	Moore et al.
2004/0133689	A1	7/2004	Vasisht	2005/0289224	A1	12/2005	Deslippe et al.
2004/0143368	A1	7/2004	May et al.	2005/0289244	A1	12/2005	Sahu et al.
2004/0143852	A1	7/2004	Meyers	2006/0041616	A1	2/2006	Ludwig et al.
2004/0147224	A1	7/2004	Lee	2006/0041639	A1	2/2006	Lamkin et al.
2004/0148237	A1	7/2004	Bittmann et al.	2006/0045281	A1	3/2006	Korneluk et al.
2004/0168081	A1	8/2004	Ladas et al.	2006/0072489	A1	4/2006	Toyoshima
2004/0170383	A1	9/2004	Mazur	2006/0095516	A1	5/2006	Wijeratne
2004/0171346	A1	9/2004	Lin	2006/0098936	A1	5/2006	Ikeda et al.
2004/0177167	A1	9/2004	Iwamura et al.	2006/0119497	A1	6/2006	Miller et al.
2004/0179554	A1	9/2004	Tsao	2006/0143236	A1	6/2006	Wu
2004/0183827	A1	9/2004	Putterman et al.	2006/0149402	A1	7/2006	Chung
2004/0185773	A1	9/2004	Gerber et al.	2006/0155721	A1	7/2006	Grunwald et al.
2004/0203354	A1	10/2004	Yue	2006/0173844	A1	8/2006	Zhang et al.
2004/0203378	A1	10/2004	Powers	2006/0179160	A1	8/2006	Uehara et al.
2004/0203590	A1	10/2004	Shteyn	2006/0193454	A1	8/2006	Abou-Chakra et al.
2004/0208158	A1	10/2004	Fellman et al.	2006/0193482	A1	8/2006	Harvey et al.
2004/0213230	A1	10/2004	Douskalis et al.	2006/0199538	A1	9/2006	Eisenbach
2004/0220687	A1	11/2004	Klotz et al.	2006/0205349	A1	9/2006	Passier et al.
2004/0223622	A1	11/2004	Lindemann et al.	2006/0222186	A1	10/2006	Paige et al.
2004/0224638	A1	11/2004	Fadell et al.	2006/0227985	A1	10/2006	Kawanami
2004/0225389	A1	11/2004	Ledoux et al.	2006/0229752	A1	10/2006	Chung
2004/0228367	A1	11/2004	Mosig et al.	2006/0259649	A1	11/2006	Hsieh et al.
2004/0248601	A1	12/2004	Chang	2006/0270395	A1	11/2006	Dhawan et al.
2004/0249490	A1	12/2004	Sakai	2006/0294569	A1	12/2006	Chung
2004/0249965	A1	12/2004	Huggins et al.	2007/0003067	A1	1/2007	Gierl et al.
2004/0249982	A1	12/2004	Arnold et al.	2007/0003075	A1	1/2007	Cooper et al.
2004/0252400	A1	12/2004	Blank et al.	2007/0022207	A1	1/2007	Millington et al.
2004/0253969	A1	12/2004	Nguyen et al.	2007/0038999	A1	2/2007	Millington et al.
2004/0264717	A1	12/2004	Fujita et al.	2007/0043847	A1	2/2007	Carter et al.
2005/0002535	A1	1/2005	Liu et al.	2007/0047712	A1	3/2007	Gross et al.
2005/0010691	A1	1/2005	Oyadomari et al.	2007/0048713	A1	3/2007	Plastina et al.
2005/0011388	A1	1/2005	Kouznetsov	2007/0054680	A1	3/2007	Mo et al.
2005/0013394	A1	1/2005	Rausch et al.	2007/0071255	A1	3/2007	Schobben
2005/0015551	A1	1/2005	Eames et al.	2007/0087686	A1	4/2007	Holm et al.
2005/0021470	A1	1/2005	Martin et al.	2007/0142022	A1	6/2007	Madonna et al.
2005/0021590	A1	1/2005	Debique et al.	2007/0142944	A1	6/2007	Goldberg et al.
2005/0027821	A1	2/2005	Alexander et al.	2007/0143493	A1	6/2007	Mullig et al.
2005/0031135	A1	2/2005	Devantier et al.	2007/0169115	A1	7/2007	Ko et al.
2005/0047605	A1	3/2005	Lee et al.	2007/0180137	A1	8/2007	Rajapakse
2005/0058149	A1	3/2005	Howe	2007/0189544	A1	8/2007	Rosenberg
2005/0060435	A1	3/2005	Xue et al.	2007/0192156	A1	8/2007	Gauger
2005/0062637	A1	3/2005	El Zabadani et al.	2007/0206829	A1	9/2007	Weinans et al.
2005/0069153	A1	3/2005	Hall et al.	2007/0223725	A1	9/2007	Neumann et al.
2005/0081213	A1	4/2005	Suzuoki et al.	2007/0249295	A1	10/2007	Ukita et al.
2005/0100174	A1	5/2005	Howard et al.	2007/0265031	A1	11/2007	Koizumi et al.
2005/0105052	A1	5/2005	McCormick et al.	2007/0271388	A1	11/2007	Bowra et al.
2005/0114538	A1	5/2005	Rose	2007/0288610	A1	12/2007	Saint et al.
2005/0120128	A1	6/2005	Willes et al.	2007/0299778	A1	12/2007	Haveson et al.
2005/0125222	A1	6/2005	Brown et al.	2008/0002836	A1	1/2008	Moeller et al.
2005/0125357	A1	6/2005	Saadat et al.	2008/0007649	A1	1/2008	Bennett
2005/0131558	A1	6/2005	Braithwaite et al.	2008/0007650	A1	1/2008	Bennett
2005/0144284	A1	6/2005	Ludwig et al.	2008/0007651	A1	1/2008	Bennett
2005/0147261	A1	7/2005	Yeh	2008/0018785	A1	1/2008	Bennett
2005/0154766	A1	7/2005	Huang et al.	2008/0022320	A1	1/2008	Ver Steeg
2005/0159833	A1	7/2005	Giaimo et al.	2008/0025535	A1	1/2008	Rajapakse
2005/0160270	A1	7/2005	Goldberg et al.	2008/0045140	A1	2/2008	Korhonen et al.
2005/0166135	A1	7/2005	Burke et al.	2008/0065232	A1	3/2008	Igoe
2005/0168630	A1	8/2005	Yamada et al.	2008/0066094	A1	3/2008	Igoe
2005/0177256	A1	8/2005	Shintani et al.	2008/0066120	A1	3/2008	Igoe
2005/0177643	A1	8/2005	Xu	2008/0072816	A1	3/2008	Riess et al.
2005/0181348	A1	8/2005	Carey et al.	2008/0075295	A1	3/2008	Mayman et al.
2005/0195205	A1	9/2005	Abrams, Jr.	2008/0077261	A1	3/2008	Baudino et al.
2005/0195823	A1	9/2005	Chen et al.	2008/0077619	A1	3/2008	Gilley et al.
2005/0195999	A1	9/2005	Takemura et al.	2008/0077620	A1	3/2008	Gilley et al.
2005/0197725	A1	9/2005	Alexander et al.	2008/0086318	A1	4/2008	Gilley et al.
2005/0198574	A1	9/2005	Lamkin et al.	2008/0091771	A1	4/2008	Allen et al.
2005/0201549	A1	9/2005	Dedieu et al.	2008/0092204	A1	4/2008	Bryce et al.
				2008/0120429	A1	5/2008	Millington et al.
				2008/0126943	A1	5/2008	Parasnis et al.
				2008/0144861	A1	6/2008	Melanson et al.
				2008/0144864	A1	6/2008	Huon et al.



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Page 8

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2008/0146289	A1	6/2008	Korneluk et al.	2013/0041954	A1	2/2013	Kim et al.
2008/0152165	A1	6/2008	Zacchi	2013/0047084	A1	2/2013	Sanders et al.
2008/0159545	A1	7/2008	Takumai et al.	2013/0051572	A1	2/2013	Goh et al.
2008/0162668	A1	7/2008	Miller	2013/0052940	A1	2/2013	Brillhart et al.
2008/0189272	A1	8/2008	Powers et al.	2013/0070093	A1	3/2013	Rivera et al.
2008/0205070	A1	8/2008	Osada	2013/0080599	A1	3/2013	Ko et al.
2008/0212786	A1	9/2008	Park	2013/0094670	A1	4/2013	Millington
2008/0215169	A1	9/2008	Debettencourt et al.	2013/0124664	A1	5/2013	Fonseca, Jr. et al.
2008/0242222	A1	10/2008	Bryce et al.	2013/0129122	A1	5/2013	Johnson et al.
2008/0247554	A1	10/2008	Caffrey	2013/0132837	A1	5/2013	Mead et al.
2008/0263010	A1	10/2008	Roychoudhuri et al.	2013/0159126	A1	6/2013	Elkady
2008/0291863	A1	11/2008	Agren	2013/0167029	A1	6/2013	Friesen et al.
2008/0303947	A1	12/2008	Ohnishi et al.	2013/0174100	A1	7/2013	Seymour et al.
2009/0011798	A1	1/2009	Yamada	2013/0174223	A1	7/2013	Dykeman et al.
2009/0017868	A1	1/2009	Ueda et al.	2013/0179163	A1	7/2013	Herbig et al.
2009/0031336	A1	1/2009	Chavez et al.	2013/0191454	A1	7/2013	Oliver et al.
2009/0060219	A1	3/2009	Inohara	2013/0197682	A1	8/2013	Millington
2009/0070434	A1	3/2009	Himmelstein	2013/0208911	A1	8/2013	Millington
2009/0089327	A1	4/2009	Kalaboukis et al.	2013/0208921	A1	8/2013	Millington
2009/0097672	A1	4/2009	Buil et al.	2013/0226323	A1	8/2013	Millington
2009/0100189	A1	4/2009	Bahren et al.	2013/0230175	A1	9/2013	Bech et al.
2009/0124289	A1	5/2009	Nishida	2013/0232416	A1	9/2013	Millington
2009/0157905	A1	6/2009	Davis	2013/0236029	A1	9/2013	Millington
2009/0164655	A1	6/2009	Pettersson et al.	2013/0243199	A1	9/2013	Kallai et al.
2009/0169030	A1	7/2009	Inohara	2013/0253679	A1	9/2013	Lambourne
2009/0180632	A1	7/2009	Goldberg et al.	2013/0253934	A1	9/2013	Parekh et al.
2009/0193345	A1	7/2009	Wensley et al.	2013/0259254	A1	10/2013	Xiang et al.
2009/0222115	A1	9/2009	Malcolm et al.	2013/0279706	A1	10/2013	Marti et al.
2009/0228919	A1	9/2009	Zott et al.	2013/0287186	A1	10/2013	Quady
2009/0232326	A1	9/2009	Gordon et al.	2013/0290504	A1	10/2013	Quady
2009/0251604	A1	10/2009	Iyer	2013/0293345	A1	11/2013	Lambourne
2010/0004983	A1	1/2010	Dickerson et al.	2014/0006483	A1	1/2014	Garmark et al.
2010/0010651	A1	1/2010	Kirkeby et al.	2014/0016784	A1	1/2014	Sen et al.
2010/0031366	A1	2/2010	Knight et al.	2014/0016786	A1	1/2014	Sen
2010/0049835	A1	2/2010	Ko et al.	2014/0016802	A1	1/2014	Sen
2010/0052843	A1	3/2010	Cannistraro	2014/0023196	A1	1/2014	Xiang et al.
2010/0067716	A1	3/2010	Katayama	2014/0037097	A1	2/2014	Labosco
2010/0087089	A1	4/2010	Struthers et al.	2014/0064501	A1	3/2014	Olsen et al.
2010/0142735	A1	6/2010	Yoon et al.	2014/0075308	A1	3/2014	Sanders et al.
2010/0153097	A1	6/2010	Hotho et al.	2014/0075311	A1	3/2014	Boettcher et al.
2010/0228740	A1	9/2010	Cannistraro et al.	2014/0079242	A1	3/2014	Nguyen et al.
2010/0272270	A1	10/2010	Chaikin et al.	2014/0108929	A1	4/2014	Garmark et al.
2010/0284389	A1	11/2010	Ramsay et al.	2014/0112481	A1	4/2014	Li et al.
2010/0290643	A1	11/2010	Mihelich et al.	2014/0123005	A1	5/2014	Forstall et al.
2010/0299639	A1	11/2010	Ramsay et al.	2014/0140530	A1	5/2014	Gomes-Casseres et al.
2011/0001632	A1	1/2011	Hohorst	2014/0161265	A1	6/2014	Chaikin et al.
2011/0002487	A1	1/2011	Panther et al.	2014/0181569	A1	6/2014	Millington et al.
2011/0044476	A1	2/2011	Burlingame et al.	2014/0219456	A1	8/2014	Morrell et al.
2011/0066943	A1	3/2011	Brillon et al.	2014/0226823	A1	8/2014	Sen et al.
2011/0110533	A1	5/2011	Choi et al.	2014/0242913	A1	8/2014	Pang
2011/0170710	A1	7/2011	Son	2014/0256260	A1	9/2014	Ueda et al.
2011/0228944	A1	9/2011	Croghan et al.	2014/0267148	A1	9/2014	Luna et al.
2011/0299696	A1	12/2011	Holmgren et al.	2014/0270202	A1	9/2014	Ivanov et al.
2011/0316768	A1	12/2011	McRae	2014/0273859	A1	9/2014	Luna et al.
2012/0029671	A1	2/2012	Millington et al.	2014/0279889	A1	9/2014	Luna et al.
2012/0030366	A1	2/2012	Collart et al.	2014/0285313	A1	9/2014	Luna et al.
2012/0047435	A1	2/2012	Holladay et al.	2014/0286496	A1	9/2014	Luna et al.
2012/0051558	A1	3/2012	Kim et al.	2014/0294200	A1	10/2014	Baumgarte et al.
2012/0051567	A1	3/2012	Castor-Perry	2014/0298174	A1	10/2014	Ikonomov
2012/0060046	A1	3/2012	Millington	2014/0323036	A1	10/2014	Daley et al.
2012/0127831	A1	5/2012	Gicklhorn et al.	2014/0344689	A1	11/2014	Scott et al.
2012/0129446	A1	5/2012	Ko et al.	2014/0355768	A1	12/2014	Sen et al.
2012/0148075	A1	6/2012	Goh et al.	2014/0355794	A1	12/2014	Morrell et al.
2012/0185771	A1	7/2012	Rothkopf et al.	2014/0378056	A1	12/2014	Liu et al.
2012/0192071	A1	7/2012	Millington	2015/0019670	A1	1/2015	Redmann
2012/0207290	A1	8/2012	Moyers et al.	2015/0026613	A1	1/2015	Kwon et al.
2012/0237054	A1	9/2012	Eo et al.	2015/0032844	A1	1/2015	Tarr et al.
2012/0263325	A1	10/2012	Freeman et al.	2015/0043736	A1	2/2015	Olsen et al.
2012/0281058	A1	11/2012	Laney et al.	2015/0049248	A1	2/2015	Wang et al.
2012/0290621	A1	11/2012	Heitz, III et al.	2015/0063610	A1	3/2015	Mossner
2013/0010970	A1	1/2013	Hegarty et al.	2015/0074527	A1	3/2015	Sevigny et al.
2013/0018960	A1	1/2013	Knysz et al.	2015/0074528	A1	3/2015	Sakalowsky et al.
2013/0028443	A1	1/2013	Pance et al.	2015/0098576	A1	4/2015	Sundaresan et al.
2013/0031475	A1	1/2013	Maor et al.	2015/0139210	A1	5/2015	Marin et al.
2013/0038726	A1	2/2013	Kim	2015/0146886	A1	5/2015	Baumgarte
				2015/0201274	A1	7/2015	Ellner et al.
				2015/0256954	A1	9/2015	Carlsson et al.
				2015/0281866	A1	10/2015	Williams et al.
				2015/0286360	A1	10/2015	Wachter et al.

## US 10,469,966 B2

Page 9

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2015/0304288 A1 10/2015 Balasaygun et al.  
 2015/0365987 A1 12/2015 Weel  
 2017/0188152 A1 6/2017 Watson et al.

## FOREIGN PATENT DOCUMENTS

CN 101095372 A 12/2007  
 CN 101292500 A 10/2008  
 CN 101785182 A 7/2010  
 EP 0251584 A2 1/1988  
 EP 0672985 A1 9/1995  
 EP 0772374 A2 5/1997  
 EP 1111527 A2 6/2001  
 EP 1122931 A2 8/2001  
 EP 1133896 B1 8/2002  
 EP 1312188 A1 5/2003  
 EP 1389853 A1 2/2004  
 EP 2713281 4/2004  
 EP 1517464 A2 3/2005  
 EP 0895427 A3 1/2006  
 EP 1416687 B1 8/2006  
 EP 1410686 3/2008  
 EP 2043381 A2 4/2009  
 EP 2161950 A2 3/2010  
 EP 1825713 B1 10/2012  
 EP 0742674 B1 4/2014  
 EP 2591617 B1 6/2014  
 EP 2860992 A1 4/2015  
 GB 2284327 A 5/1995  
 GB 2338374 12/1999  
 GB 2379533 A 3/2003  
 GB 2486183 6/2012  
 JP 63269633 11/1988  
 JP 07-210129 8/1995  
 JP 2000149391 A 5/2000  
 JP 2001034951 2/2001  
 JP 2002111817 4/2002  
 JP 2002123267 A 4/2002  
 JP 2002358241 A 12/2002  
 JP 2003037585 2/2003  
 JP 2003506765 A 2/2003  
 JP 2003101958 4/2003  
 JP 2003169089 A 6/2003  
 JP 2004193868 A 7/2004  
 JP 2005108427 4/2005  
 JP 2005136457 5/2005  
 JP 2007241652 A 9/2007  
 JP 2007288405 A 11/2007  
 JP 2009506603 A 2/2009  
 JP 2009135750 6/2009  
 JP 2009218888 9/2009  
 JP 2009535708 10/2009  
 JP 2009538006 A 10/2009  
 JP 2011010183 A 1/2011  
 JP 2011130496 6/2011  
 JP 2011176581 9/2011  
 TW 439027 6/2001  
 WO 199525313 9/1995  
 WO 1999023560 5/1999  
 WO 199961985 12/1999  
 WO 0019693 A1 4/2000  
 WO 2000019693 A1 4/2000  
 WO 0110125 A1 2/2001  
 WO 200153994 7/2001  
 WO 02073851 9/2002  
 WO 03093950 A2 11/2003  
 WO 2003093950 A2 11/2003  
 WO 2005013047 A2 2/2005  
 WO 2007023120 A1 3/2007  
 WO 2007127485 11/2007  
 WO 2007131555 11/2007  
 WO 2007135581 A2 11/2007  
 WO 2008082350 A1 7/2008  
 WO 2008114389 A1 9/2008  
 WO 2012050927 4/2012

WO 2012137190 A1 10/2012  
 WO 2013012582 1/2013  
 WO 2014004182 1/2014  
 WO 2014149533 A2 9/2014  
 WO 2015024881 A1 2/2015

## OTHER PUBLICATIONS

Non-Final Office Action dated Nov. 19, 2014, issued in connection with U.S. Appl. No. 13/848,921, filed Mar. 22, 2013, 9 pages.  
 Non-Final Office Action dated Aug. 20, 2009, issued in connection with U.S. Appl. No. 11/906,702, filed Oct. 2, 2007, 27 pages.  
 Non-Final Office Action dated Oct. 20, 2016, issued in connection with U.S. Appl. No. 14/563,515, filed Dec. 8, 2014, 10 pages.  
 Non-Final Office Action dated Sep. 21, 2016, issued in connection with U.S. Appl. No. 15/080,591, filed Mar. 25, 2016, 9 pages.  
 Non-Final Office Action dated Sep. 21, 2016, issued in connection with U.S. Appl. No. 15/080,716, filed Mar. 25, 2016, 8 pages.  
 Non-Final Office Action dated Sep. 21, 2016, issued in connection with U.S. Appl. No. 15/088,283, filed Apr. 1, 2016, 9 pages.  
 Non-Final Office Action dated Sep. 21, 2016, issued in connection with U.S. Appl. No. 15/088,532, filed Apr. 1, 2016, 9 pages.  
 Non-Final Office Action dated Aug. 22, 2018, issued in connection with U.S. Appl. No. 15/487,686, filed Apr. 14, 2017, 13 pages.  
 Non-Final Office Action dated Dec. 22, 2014, issued in connection with U.S. Appl. No. 13/458,558, filed Apr. 27, 2012, 11 pages.  
 Non-Final Office Action dated Sep. 22, 2016, issued in connection with U.S. Appl. No. 15/088,906, filed Apr. 1, 2016, 9 pages.  
 Non-Final Office Action dated Sep. 22, 2016, issued in connection with U.S. Appl. No. 15/155,149, filed May 16, 2016, 7 pages.  
 Non-Final Office Action dated Jun. 23, 2015, issued in connection with U.S. Appl. No. 13/705,176, filed Dec. 5, 2012, 30 pages.  
 Non-Final Office Action dated Mar. 23, 2015, issued in connection with U.S. Appl. No. 14/299,847, filed Jun. 9, 2014, 14 pages.  
 Non-Final Office Action dated Oct. 23, 2014, issued in connection with U.S. Appl. No. 13/848,904, filed Mar. 22, 2013, 11 pages.  
 Non-Final Office Action dated Oct. 23, 2014, issued in connection with U.S. Appl. No. 13/864,251, filed Apr. 17, 2013, 11 pages.  
 Non-Final Office Action dated Oct. 23, 2014, issued in connection with U.S. Appl. No. 13/888,203, filed May 6, 2013, 9 pages.  
 Non-Final Office Action dated Sep. 23, 2014, issued in connection with U.S. Appl. No. 13/630,565, filed Sep. 28, 2012, 7 pages.  
 Non-Final Office Action dated Feb. 24, 2017, issued in connection with U.S. Appl. No. 14/619,813, filed Feb. 11, 2015, 9 pages.  
 Non-Final Office Action dated May 24, 2016, issued in connection with U.S. Appl. No. 15/134,767, filed Apr. 21, 2016, 12 pages.  
 Non-Final Office Action dated Oct. 24, 2014, issued in connection with U.S. Appl. No. 13/435,776, filed Mar. 30, 2012, 14 pages.  
 Non-Final Office Action dated Apr. 25, 2018, issued in connection with U.S. Appl. No. 15/130,919, filed Apr. 15, 2016, 13 pages.  
 Non-Final Office Action dated Feb. 26, 2015, issued in connection with U.S. Appl. No. 14/186,850, filed Feb. 21, 2014, 25 pages.  
 Non-Final Office Action dated Mar. 26, 2015, issued in connection with U.S. Appl. No. 14/184,528, filed Feb. 19, 2014, 18 pages.  
 Non-Final Office Action dated Jan. 27, 2015, issued in connection with U.S. Appl. No. 14/465,457, filed Aug. 21, 2014, 11 pages.  
 Non-Final Office Action dated Jun. 27, 2008, issued in connection with U.S. Appl. No. 10/861,653, filed Jun. 5, 2004, 19 pages.  
 Non-Final Office Action dated Mar. 27, 2015, issued in connection with U.S. Appl. No. 13/705,178, filed Dec. 5, 2012, 14 pages.  
 Non-Final Office Action dated Sep. 27, 2013, issued in connection with U.S. Appl. No. 13/013,740, filed Jan. 25, 2011, 12 pages.  
 Non-Final Office Action dated Sep. 27, 2016, issued in connection with U.S. Appl. No. 15/228,685, filed Aug. 4, 2016, 8 pages.  
 Non-Final Office Action dated Dec. 28, 2015, issued in connection with U.S. Appl. No. 14/290,493, filed May 29, 2014, 29 pages.  
 Non-Final Office Action dated Dec. 28, 2016, issued in connection with U.S. Appl. No. 15/343,000, filed Nov. 3, 2016, 11 pages.  
 Non-Final Office Action dated Jan. 29, 2016, issued in connection with U.S. Appl. No. 14/937,523, filed Nov. 10, 2015, 10 pages.  
 Non-Final Office Action dated Jun. 29, 2016, issued in connection with U.S. Appl. No. 14/629,937, filed Feb. 24, 2015, 12 pages.

## US 10,469,966 B2

Page 10

(56)

## References Cited

## OTHER PUBLICATIONS

Non-Final Office Action dated Apr. 30, 2012, issued in connection with U.S. Appl. No. 13/204,511, filed Aug. 5, 2011, 16 pages.

Non-Final Office Action dated Jan. 30, 2015, issued in connection with U.S. Appl. No. 14/290,493, filed May 29, 2014, 29 pages.

Non-Final Office Action dated Jan. 30, 2015, issued in connection with U.S. Appl. No. 14/504,812, filed Oct. 2, 2014, 13 pages.

Non-Final Office Action dated Nov. 30, 2016, issued in connection with U.S. Appl. No. 15/243,186, filed Aug. 22, 2016, 12 pages.

Non-Final Office Action dated Oct. 30, 2018, issued in connection with U.S. Appl. No. 16/128,443, filed Sep. 11, 2018, 21 pages.

Non-Final Office Action dated Sep. 30, 2016, issued in connection with U.S. Appl. No. 13/864,249, filed Apr. 17, 2013, 12 pages.

Non-Final Office Action dated Oct. 31, 2016, issued in connection with U.S. Appl. No. 14/806,070, filed Jul. 22, 2015, 11 pages.

North American MPEG-2 Information, "The MPEG-2 Transport Stream," Retrieved from the Internet: URL: <http://www.coolstf.mpeg/#ts>, 2006, pp. 1-5.

Notice of Allowability dated Apr. 18, 2013, issued in connection with U.S. Appl. No. 11/853,790, filed Sep. 11, 2007, 4 pages.

Notice of Allowance dated Jan. 31, 2013, issued in connection with U.S. Appl. No. 13/298,090, filed Nov. 16, 2011, 19 pages.

Notice of Allowance dated Dec. 1, 2016, issued in connection with U.S. Appl. No. 15/088,283, filed Apr. 1, 2016, 9 pages.

Notice of Allowance dated Jun. 1, 2017, issued in connection with U.S. Appl. No. 14/808,397, filed Jul. 24, 2015, 5 pages.

Notice of Allowance dated Dec. 2, 2016, issued in connection with U.S. Appl. No. 15/088,532, filed Apr. 1, 2016, 9 pages.

Notice of Allowance dated Dec. 2, 2016, issued in connection with U.S. Appl. No. 15/088,678, filed Apr. 1, 2016, 9 pages.

Notice of Allowance dated Dec. 2, 2016, issued in connection with U.S. Appl. No. 15/089,758, filed Apr. 4, 2016, 9 pages.

Notice of Allowance dated Dec. 2, 2016, issued in connection with U.S. Appl. No. 15/155,149, filed May 16, 2016, 9 pages.

Notice of Allowance dated Jul. 2, 2015, issued in connection with U.S. Appl. No. 13/848,904, filed Mar. 22, 2013, 17 pages.

Notice of Allowance dated Jul. 2, 2015, issued in connection with U.S. Appl. No. 13/888,203, filed May 6, 2013, 19 pages.

"ZR-8630AV MultiZone Audio/Video Receiver, Installation and Operation Guide," Niles Audio Corporation, 2003, 86 pages.

ZX135: Installation Manual, LA Audio, Apr. 2003, 44 pages.

*Sonos, Inc. v. D&M Holdings, Inc.*, Defendants' Final Invalidation Contentions (Jan. 18, 2017) (106 pages).

*Sonos, Inc. v. D&M Holdings*, DI 226, Opinion Denying Inequitable Conduct Defenses, Feb. 6, 2017, updated, 5 pages.

*Sonos, Inc. v. D&M Holdings*, DI 242, US District Judge Andrews 101 Opinion, Mar. 2017, 16 pages.

*Sonos, Inc. v. D&M Holdings*, Sonos Supp Opening Markman Brief including Exhibits, Mar. 3, 2017, 17 pages.

*Sonos, Inc. v. D&M Holdings*, Sonos Supp Reply Markman Brief including Exhibits, Mar. 29, 2017, 36 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Declaration of Steven C. Visser, executed Sep. 9, 2016, 40 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Invalidation Contentions Exhibit 1: Defendants' Invalidation Contentions for U.S. Pat. No. 7,571,014 filed Sep. 16, 2016, 270 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Invalidation Contentions Exhibit 10: Defendants' Invalidation Contentions for U.S. Pat. No. 9,219,959 filed Sep. 27, 2016, 236 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Invalidation Contentions Exhibit 11: Defendants' Invalidation Contentions for Design U.S. Pat. No. D. 559,197 filed Sep. 27, 2016, 52 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Invalidation Contentions Exhibit 2: Defendants' Invalidation Contentions for U.S. Pat. No. 8,588,949 filed Sep. 27, 2016, 224 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Invalidation Contentions Exhibit 3: Defendants' Invalidation Contentions for U.S. Pat. No. 8,843,224 filed Sep. 27, 2016, 147 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Invalidation Contentions Exhibit 4: Defendants' Invalidation Contentions for U.S. Pat. No. 8,938,312 filed Sep. 27, 2016, 229 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Invalidation Contentions Exhibit 5: Defendants' Invalidation Contentions for U.S. Pat. No. 8,938,637 filed Sep. 27, 2016, 213 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Invalidation Contentions Exhibit 6: Defendants' Invalidation Contentions for U.S. Pat. No. 9,042,556 filed Sep. 27, 2016, 162 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Invalidation Contentions Exhibit 7: Defendants' Invalidation Contentions for U.S. Pat. No. 9,195,258 filed Sep. 27, 2016, 418 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Invalidation Contentions Exhibit 8: Defendants' Invalidation Contentions for U.S. Pat. No. 9,202,509 filed Sep. 27, 2016, 331 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Invalidation Contentions Exhibit 9: Defendants' Invalidation Contentions for U.S. Pat. No. 9,213,357 filed Sep. 27, 2016, 251 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidation Contentions Exhibit 1: Defendants' Invalidation Contentions for U.S. Pat. No. 7,571,014 filed Apr. 15, 2016, 161 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidation Contentions Exhibit 10: Defendants' Invalidation Contentions for U.S. Pat. No. 9,213,357 filed Apr. 15, 2016, 244 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidation Contentions Exhibit 11: Defendants' Invalidation Contentions for U.S. Pat. No. 9,219,959 filed Apr. 15, 2016, 172 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidation Contentions Exhibit 12: Defendants' Invalidation Contentions for Design U.S. Pat. No. D. 559,197 filed Apr. 15, 2016, 36 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidation Contentions Exhibit 2: Defendants' Invalidation Contentions for U.S. Pat. No. 8,588,949 filed Apr. 15, 2016, 112 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidation Contentions Exhibit 3: Defendants' Invalidation Contentions for U.S. Pat. No. 8,843,224 filed Apr. 15, 2016, 118 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidation Contentions Exhibit 4: Defendants' Invalidation Contentions for U.S. Pat. No. 8,938,312 filed Apr. 15, 2016, 217 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidation Contentions Exhibit 5: Defendants' Invalidation Contentions for U.S. Pat. No. 8,938,637 filed Apr. 15, 2016, 177 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidation Contentions Exhibit 6: Defendants' Invalidation Contentions for U.S. Pat. No. 9,042,556 filed Apr. 15, 2016, 86 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidation Contentions Exhibit 7: Defendants' Invalidation Contentions for U.S. Pat. No. 9,130,771 filed Apr. 15, 2016, 203 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidation Contentions Exhibit 8: Defendants' Invalidation Contentions for U.S. Pat. No. 9,195,258 filed Apr. 15, 2016, 400 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidation Contentions Exhibit 9: Defendants' Invalidation Contentions for U.S. Pat. No. 9,202,509 filed Apr. 15, 2016, 163 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Preliminary Identification of Prior Art References, provided Jul. 29, 2016, 5 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendants' Brief in Support of their Motion for Leave to Amend their Answer to Add the Defense of Inequitable Conduct, provided Oct. 12, 2016, 24 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendants' Opposition to Sonos's Motion to Strike Defendants' New Amended Answer Submitted with their Reply, provided Oct. 3, 2016, 15 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Exhibit A: Defendants' Second Amended Answer to Plaintiffs' Third Amended complaint, provided Oct. 12, 2016, 43 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Exhibit B: Defendants' Second Amended Answer to Plaintiffs' Third Amended Complaint, provided Oct. 12, 2016, 43 pages.



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(56)

## References Cited

## OTHER PUBLICATIONS

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Opening Brief in Support of Defendants' Motion for Leave to Amend Their Answer to Add the Defense of Inequitable Conduct, provided Aug. 1, 2016, 11 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Order, provided Oct. 7, 2016, 2 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Plaintiff's Opposition to Defendants' Motion for Leave to Amend Their Answer to Add the Defense of Inequitable Conduct, provided Aug. 26, 2016, 25 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Redlined Exhibit B: Defendants' First Amended Answer to Plaintiffs' Third Amended Complaint, provided Aug. 1, 2016, 27 pages.

*Sonos, Inc. v. D&M Holdings*, DI 206-1, Transcript of 101 Hearing (Nov. 28, 2016) (28 pages).

*Sonos, Inc. v. D&M Holdings*, DI 207, Public Joint Claim Construction Brief (Nov. 30, 2016) (88 pages).

*Sonos, Inc. v. D&M Holdings*, DI 214, D&M Post-Markman Letter (Dec. 22, 2016) (13 pages).

*Sonos, Inc. v. D&M Holdings*, DI 215, Sonos Post-Markman Letter (Dec. 22, 2016) (15 pages).

*Sonos, Inc. v. D&M Holdings*, DI 219, Claim Construction Opinion (Jan. 12, 2017) (24 pages).

*Sonos, Inc. v. D&M Holdings*, DI 221, Claim Construction Order (Jan. 18, 2017) (2 pages).

*Sonos, Inc. v. D&M Holdings*, Markman Hearing Transcript (Dec. 14, 2016) (69 pages).

Sonos Multi-Room Music System User Guide, Version: 091001, 2009, 299 pages.

Sonos Play:3 Product Guide; copyright 2004-2011; 2 pages.

Sonos Play:3 Product Guide; copyright 2004-2012; 14 pages.

Sonos Play:3 Product Guide; copyright 2004-2013; 15 pages.

Sonos Play:3 Teardown; <https://www.ifixit.com/Teardown/Sonos+Play%3A3+Teardown/12475>; 11 pages.

Non-Final Office Action dated May 27, 2014, issued in connection with U.S. Appl. No. 14/186,850, filed Feb. 21, 2014, 13 pages.

Non-Final Office Action dated Feb. 29, 2012, issued in connection with U.S. Appl. No. 13/297,000, filed Nov. 15, 2011, 10 pages.

Non-Final Office Action dated Nov. 29, 2010, issued in connection with U.S. Appl. No. 11/801,468, filed May 9, 2007, 17 pages.

Non-Final Office Action dated Jul. 30, 2013 issued in connection with U.S. Appl. No. 13/724,048, filed Dec. 21, 2012, 7 pages.

Non-Final Office Action dated Jul. 31, 2014, issued in connection with U.S. Appl. No. 13/533,105, filed Jun. 26, 2012, 31 pages.

Non-Final Office Action dated Dec. 1, 2014, issued in connection with U.S. Appl. No. 14/516,867, filed Oct. 17, 2014, 11 pages.

Non-Final Office Action dated Jun. 1, 2016, issued in connection with U.S. Appl. No. 14/184,522, filed Feb. 19, 2014, 21 pages.

Non-Final Office Action dated Jan. 3, 2017, issued in connection with U.S. Appl. No. 14/808,397, filed Jul. 24, 2015, 11 pages.

Non-Final Office Action dated Jun. 3, 2015, issued in connection with U.S. Appl. No. 14/564,544, filed Dec. 9, 2014, 7 pages.

Non-Final Office Action dated Nov. 3, 2016, issued in connection with U.S. Appl. No. 14/184,528, filed Feb. 19, 2014, 17 pages.

Non-Final Office Action dated Jan. 4, 2017, issued in connection with U.S. Appl. No. 14/825,961, filed Aug. 13, 2015, 11 pages.

Non-Final Office Action dated Jun. 4, 2015, issued in connection with U.S. Appl. No. 13/871,795, filed Apr. 26, 2013, 16 pages.

Non-Final Office Action dated Mar. 4, 2015, issued in connection with U.S. Appl. No. 13/435,776, filed Mar. 30, 2012, 16 pages.

Non-Final Office Action dated Oct. 4, 2016, issued in connection with U.S. Appl. No. 15/089,758, filed Apr. 4, 2016, 9 pages.

Non-Final Office Action dated Oct. 5, 2016, issued in connection with U.S. Appl. No. 13/864,250, filed Apr. 17, 2013, 10 pages.

Non-Final Office Action dated Oct. 5, 2016, issued in connection with U.S. Appl. No. 13/864,252, filed Apr. 17, 2013, 11 pages.

Non-Final Office Action dated Oct. 6, 2016, issued in connection with U.S. Appl. No. 15/088,678, filed Apr. 1, 2016, 9 pages.

Non-Final Office Action dated Jul. 7, 2015, issued in connection with U.S. Appl. No. 14/174,244, filed Feb. 6, 2014, 9 pages.

Non-Final Office Action dated Oct. 7, 2016, issued in connection with U.S. Appl. No. 15/156,392, filed May 17, 2016, 8 pages.

Non-Final Office Action dated Mar. 8, 2011, issued in connection with U.S. Appl. No. 11/853,790, filed Sep. 11, 2007, 10 pages.

Non-Final Office Action dated Mar. 8, 2016, issued in connection with U.S. Appl. No. 13/848,921, filed Mar. 22, 2013, 13 pages.

Non-Final Office Action dated Aug. 9, 2016, issued in connection with U.S. Appl. No. 13/871,795, filed Apr. 26, 2013, 31 pages.

Non-Final Office Action dated May 9, 2014, issued in connection with U.S. Appl. No. 13/892,230, filed May 10, 2013, 10 pages.

Non-Final Office Action dated Nov. 1, 2018, issued in connection with U.S. Appl. No. 16/129,758, filed Sep. 12, 2018, 23 pages.

Non-Final Office Action dated Feb. 10, 2016, issued in connection with U.S. Appl. No. 14/937,571, filed Nov. 10, 2015, 9 pages.

Non-Final Office Action dated Mar. 10, 2011, issued in connection with U.S. Appl. No. 12/035,112, filed Feb. 21, 2008, 12 pages.

Non-Final Office Action dated May 10, 2016, issued in connection with U.S. Appl. No. 14/504,812, filed Oct. 2, 2014, 22 pages.

Non-Final Office Action dated Nov. 10, 2016, issued in connection with U.S. Appl. No. 15/243,355, filed Aug. 22, 2016, 11 pages.

Non-Final Office Action dated Jun. 11, 2018, issued in connection with U.S. Appl. No. 15/405,931, filed Jan. 13, 2017, 14 pages.

Non-Final Office Action dated Dec. 12, 2016, issued in connection with U.S. Appl. No. 15/343,019, filed Nov. 3, 2016, 8 pages.

Non-Final Office Action dated Jun. 12, 2015, issued in connection with U.S. Appl. No. 13/848,932, filed Mar. 22, 2013, 16 pages.

Non-Final Office Action dated Mar. 12, 2015, issued in connection with U.S. Appl. No. 13/705,174, filed Dec. 5, 2012, 13 pages.

Non-Final Office Action dated Oct. 12, 2016, issued in connection with U.S. Appl. No. 14/505,966, filed Oct. 3, 2014, 10 pages.

Non-Final Office Action dated Feb. 13, 2014, issued in connection with U.S. Appl. No. 13/896,037, filed May 16, 2013, 10 pages.

Non-Final Office Action dated Feb. 13, 2015, issued in connection with U.S. Appl. No. 13/013,740, filed Jan. 25, 2011, 14 pages.

Non-Final Office Action dated Jan. 13, 2016, issued in connection with U.S. Appl. No. 14/184,528, filed Feb. 19, 2014, 14 pages.

Non-Final Office Action dated Jun. 13, 2016, issued in connection with U.S. Appl. No. 14/620,937, filed Feb. 12, 2015, 12 pages.

Non-Final Office Action dated Jun. 13, 2016, issued in connection with U.S. Appl. No. 15/134,761, filed Apr. 21, 2016, 10 pages.

Non-Final Office Action dated Mar. 13, 2015, issued in connection with U.S. Appl. No. 13/705,177, filed Dec. 5, 2012, 15 pages.

Non-Final Office Action dated May 14, 2018, issued in connection with U.S. Appl. No. 15/228,812, filed Aug. 4, 2016, 15 pages.

Non-Final Office Action dated Dec. 15, 2016, issued in connection with U.S. Appl. No. 13/458,558, filed Apr. 27, 2012, 12 pages.

Non-Final Office Action dated Jul. 15, 2015, issued in connection with U.S. Appl. No. 14/174,253, filed Feb. 6, 2014, 9 pages.

Non-Final Office Action dated Nov. 16, 2016, issued in connection with U.S. Appl. No. 15/228,639, filed Aug. 4, 2016, 15 pages.

Non-Final Office Action dated Dec. 17, 2015, issued in connection with U.S. Appl. No. 13/458,558, filed Apr. 27, 2012, 10 pages.

Non-Final Office Action dated Nov. 17, 2014, issued in connection with U.S. Appl. No. 13/864,247, filed Apr. 17, 2013, 11 pages.

Non-Final Office Action dated Nov. 17, 2016, issued in connection with U.S. Appl. No. 14/620,937, filed Feb. 12, 2015, 14 pages.

Non-Final Office Action dated Feb. 18, 2009, issued in connection with U.S. Appl. No. 10/861,653, filed Jun. 5, 2004, 18 pages.

Non-Final Office Action dated Nov. 18, 2014, issued in connection with U.S. Appl. No. 13/435,739, filed Mar. 30, 2012, 10 pages.

Non-Final Office Action dated Jan. 19, 2018, issued in connection with U.S. Appl. No. 14/629,937, filed Feb. 24, 2015, 14 pages.

Non-Final Office Action dated Jun. 19, 2015, issued in connection with U.S. Appl. No. 13/533,105, filed Jun. 26, 2012, 38 pages.

Notice of Allowance dated Oct. 24, 2016, issued in connection with U.S. Appl. No. 15/134,767, filed Apr. 21, 2016, 7 pages.

Notice of Allowance dated Sep. 24, 2015, issued in connection with U.S. Appl. No. 13/705,174, filed Dec. 5, 2012, 7 pages.

Notice of Allowance dated Sep. 24, 2015, issued in connection with U.S. Appl. No. 14/184,935, filed Feb. 20, 2014, 7 pages.

Notice of Allowance dated Aug. 25, 2017, issued in connection with U.S. Appl. No. 14/505,966, filed Oct. 3, 2014, 5 pages.

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(56)

## References Cited

## OTHER PUBLICATIONS

Notice of Allowance dated Sep. 25, 2014, issued in connection with U.S. Appl. No. 14/176,808, filed Feb. 10, 2014, 5 pages.

Notice of Allowance dated Aug. 27, 2015, issued in connection with U.S. Appl. No. 13/705,177, filed Dec. 5, 2012, 34 pages.

Notice of Allowance dated Aug. 27, 2015, issued in connection with U.S. Appl. No. 14/505,027, filed Oct. 2, 2014, 18 pages.

Notice of Allowance dated Dec. 27, 2011, issued in connection with U.S. Appl. No. 10/816,217, filed Apr. 1, 2004, 15 pages.

Notice of Allowance dated Oct. 27, 2015, issued in connection with U.S. Appl. No. 14/299,847, filed Jun. 9, 2014, 5 pages.

Notice of Allowance dated Dec. 28, 2014, issued in connection with U.S. Appl. No. 13/896,037, filed May 16, 2013, 7 pages.

Notice of Allowance dated Jul. 29, 2015, issued in connection with U.S. Appl. No. 13/359,976, filed Jan. 27, 2012, 28 pages.

Notice of Allowance dated Jul. 29, 2015, issued in connection with U.S. Appl. No. 14/186,850, filed Feb. 21, 2014, 9 pages.

Notice of Allowance dated Aug. 30, 2016, issued in connection with U.S. Appl. No. 14/290,493, filed May 29, 2014, 7 pages.

Notice of Allowance dated Jul. 30, 2015, issued in connection with U.S. Appl. No. 13/705,178, filed Dec. 5, 2012, 18 pages.

Notice of Allowance dated May 30, 2019, issued in connection with U.S. Appl. No. 16/129,758, filed Sep. 12, 2018, 7 pages.

Notice of Allowance dated Aug. 5, 2015, issued in connection with U.S. Appl. No. 13/435,776, filed Mar. 30, 2012, 26 pages.

Notice of Allowance dated Jul. 6, 2015, issued in connection with U.S. Appl. No. 13/297,000, filed Nov. 15, 2011, 24 pages.

Notice of Allowance dated Apr. 7, 2017, issued in connection with U.S. Appl. No. 14/629,937, filed Feb. 24, 2015, 8 pages.

Notice of Allowance dated Dec. 7, 2018, issued in connection with U.S. Appl. No. 15/228,812, filed Aug. 4, 2016, 7 pages.

Notice of Incomplete Re-Exam Request dated May 25, 2017, issued in connection with U.S. Appl. No. 90/013,959, filed Apr. 1, 2016, 10 pages.

Notice of Intent to Issue Re-Examination Certificate dated Mar. 24, 2017, issued in connection with U.S. Appl. No. 90/013,859, filed Nov. 4, 2016, 10 pages.

Nutzel et al., "Sharing Systems for Future HiFi Systems," IEEE, 2004, 9 pages.

Office Action in Ex Parte Reexamination dated Oct. 20, 2017, issued in connection with Reexamination U.S. Appl. No. 90/013,959, filed Jun. 16, 2017, 50 pages.

Palm, Inc., "Handbook for the Palm VII Handheld," May 2000, 311 pages.

Parasound Zpre2 Zone Preamplifier with PTZI Remote Control, 2005, 16 pages.

Park et al., "Group Synchronization in MultiCast Media Communications," Proceedings of the 5th Research on Multicast Technology Workshop, 2003, 5 pages.

Pillai et al., "A Method to Improve the Robustness of MPEG Video Applications over Wireless Networks," Kent Ridge Digital Labs, 2000, 15 pages.

Polycom Conference Composer User Guide, copyright 2001, 29 pages.

Postel, J., "User Datagram Protocol," RFC: 768, USC/Information Sciences Institute, Aug. 1980, 3 pages.

Preinterview First Office Action dated Jun. 8, 2016, issued in connection with U.S. Appl. No. 14/619,813, filed Feb. 11, 2015, 4 pages.

Pre-Interview First Office Action dated Mar. 10, 2015, issued in connection with U.S. Appl. No. 14/505,027, filed Oct. 2, 2014, 4 pages.

Presentations at WinHEC 2000, May 2000, 138 pages.

PRISMIQ, Inc., "PRISMIQ Media Player User Guide," 2003, 44 pages.

Proficient Audio Systems M6 Quick Start Guide, 2011, 5 pages.

Proficient Audio Systems: Proficient Editor Advanced Programming Guide, 2007, 40 pages.

Programming Interface for WL54040 Dual-Band Wireless Transceiver, AVAGO0066, Agere Systems, May 2004, 16 pages.

Radio Shack, "Auto-Sensing 4-Way Audio/Video Selector Switch," 2004, 1 page.

RadioShack, Pro-2053 Scanner, 2002 Catalog, part 1, 100 pages.

RadioShack, Pro-2053 Scanner, 2002 Catalog, part 2, 100 pages.

RadioShack, Pro-2053 Scanner, 2002 Catalog, part 3, 100 pages.

RadioShack, Pro-2053 Scanner, 2002 Catalog, part 4, 100 pages.

RadioShack, Pro-2053 Scanner, 2002 Catalog, part 5, 46 pages.

Rane: DragNet software; available for sale at least 2006.

Rangan et al., "Feedback Techniques for Continuity and Synchronization in Multimedia Information Retrieval," ACM Transactions on Information Systems, 1995, pp. 145-176, vol. 13, No. 2.

Real Time Control Protocol (RTCP) and Realtime Transfer Protocol (RTP), RFC 1889 (Jan. 1996) (D+M\_0397810-84) (75 pages).

Realtime Streaming Protocol (RTSP), RFC 2326 (Apr. 1998) (D+M\_0397945-8036) (92 pages).

Realtime Transport Protocol (RTP), RFC 3550 (Jul. 2003) (D+M\_0398235-323) (89 pages).

Re-Exam Final Office Action dated Aug. 5, 2015, issued in connection with U.S. Appl. No. 90/013,423, filed Jan. 5, 2015, 25 pages.

Reexam Non-Final Office Action dated Oct. 17, 2016, issued in connection with U.S. Appl. No. 90/013,756, filed May 25, 2016, 31 pages.

Re-Exam Non-Final Office Action dated Apr. 22, 2015, issued in connection with U.S. Appl. No. 90/013,423, filed Jan. 5, 2015, 16 pages.

Levergood et al., "AudioFile: A Network-Transparent System for Distributed Audio Applications," Digital Equipment Corporation, 1993, 109 pages.

LG: RJP-201M Remote Jack Pack Installation and Setup Guide, 2010, 24 pages.

Lienhart et al., "On the Importance of Exact Synchronization for Distributed Audio Signal Processing," Session L: Poster Session II—ICASSP'03 Papers, 2002, 1 page.

LinkSys by Cisco, Wireless Home Audio Controller, Wireless-N Touchscreen Remote DMRW1000 Datasheet, Copyright 2008, 2 pages.

LinkSys by Cisco, Wireless Home Audio Controller, Wireless-N Touchscreen Remote DMRW1000 User Guide, Copyright 2008, 64 pages.

LinkSys by Cisco, Wireless Home Audio Player, Wireless-N Music Extender DMP100 Quick Installation Guide, Copyright 2009, 32 pages.

LinkSys by Cisco, Wireless Home Audio Player, Wireless-N Music Extender DMP100 User Guide, Copyright 2008, 65 pages.

Linux SDK for UPnP Devices v. 1.2 (Sep. 6, 2002) (101 pages).

Liu et al., "A synchronization control scheme for real-time streaming multimedia applications," Packet Video, 2003, 10 pages, vol. 2003.

Liu et al., "Adaptive Delay Concealment for Internet Voice Applications with Packet-Based Time-Scale Modification," Information Technologies 2000, pp. 91-102.

Louderback, Jim, "Affordable Audio Receiver Furnishes Homes With MP3," TechTV Vault. Jun. 28, 2000 retrieved Jul. 10, 2014, 2 pages.

Machine Translation of JP2004-193868A Wireless Transmission and Reception System and Wireless Transmission and Reception Method, 2 pages.

Machine Translation of JP2007-2888405A Video Sound Output System, Video Sound Processing Method, and Program, 64 pages.

Maniactools, "Identify Duplicate Files by Sound," Sep. 28, 2010, <http://www.maniactools.com/soft/music-duplicate-remover/identify-duplicate-files-by-sound.shtml>.

MediaRenderer:1 Device Template Version 1.01 for UPnP, Version 1.0 (Jun. 25, 2002) (12 pages).

MediaServer:1 Device Template Version 1.01 for UPnP, Version 1.0 (Jun. 25, 2002) (12 pages).

Microsoft, Universal Plug and Play (UPnP) Client Support ("Microsoft UPnP") (Aug. 2001) (D+M\_0402007-24) (18 pages).

Microsoft Window's XP Reviewer's Guide (Aug. 2001) (D+M\_0402225-85) (61 pages).



## US 10,469,966 B2

Page 13

(56) **References Cited**

## OTHER PUBLICATIONS

"Microsoft Windows XP File and Printer Share with Microsoft Windows" Microsoft Windows XP Technical Article, 2003, 65 pages.

Mills David L., "Network Time Protocol (Version 3) Specification, Implementation and Analysis," Network Working Group, Mar. 1992, 7 pages.

Mills, David L., "Precision Synchronization of Computer Network Clocks," ACM SIGCOMM Computer Communication Review, 1994, pp. 28-43, vol. 24, No. 2.

"Model MRC44 Four Zone—Four Source Audio/Video Controller/Amplifier System," Xantech Corporation, 2002, 52 pages.

Motorola, "Simplefi, Wireless Digital Audio Receiver, Installation and User Guide," Dec. 31, 2001, 111 pages.

"SMPTE Made Simple: A Time Code Tutor by Timeline," 1996, 46 pages.

Network Time Protocol (NTP), RFC 1305 (Mar. 1992) (D+M\_0397417-536) (120 pages).

"NexSys Software v.3 Manual," Crest Audio, Inc., 1997, 76 pages.

Niederst, Jennifer "O'Reilly Web Design in a Nutshell," Second Edition, Sep. 2001, 678 pages.

Nilsson, M., "ID3 Tag Version 2," Mar. 26, 1998, 28 pages.

Non-Final Office Action dated May 1, 2014, issued in connection with U.S. Appl. No. 14/184,522, filed Feb. 19, 2014, 31 pages.

Non-Final Office Action dated Dec. 5, 2013, issued in connection with U.S. Appl. No. 13/827,653, filed Mar. 14, 2013, 28 pages.

Non-Final Office Action dated Jan. 5, 2012, issued in connection with U.S. Appl. No. 13/298,090, filed Nov. 16, 2011, 40 pages.

Non-Final Office Action dated May 6, 2014, issued in connection with U.S. Appl. No. 13/705,176, filed Dec. 5, 2012, 23 pages.

Non-Final Office Action dated Jan. 7, 2014, issued in connection with U.S. Appl. No. 13/896,829, filed May 17, 2013, 11 pages.

Non-Final Office Action dated Sep. 7, 2016, issued in connection with U.S. Appl. No. 13/864,248, filed Apr. 17, 2013, 12 pages.

Non-final Office Action dated Apr. 10, 2013, issued in connection with U.S. Appl. No. 13/619,237, filed Sep. 14, 2012, 10 pages.

Non-Final Office Action dated Feb. 10, 2014, issued in connection with U.S. Appl. No. 13/083,499, filed Apr. 8, 2011, 12 pages.

Non-Final Office Action dated May 12, 2014, issued in connection with U.S. Appl. No. 14/184,528, filed Feb. 19, 2014, 23 pages.

Non-Final Office Action dated May 14, 2014, issued in connection with U.S. Appl. No. 13/848,932, filed Mar. 22, 2013, 14 pages.

Non-Final Office Action dated Jun. 17, 2014, issued in connection with U.S. Appl. No. 14/176,808, filed Feb. 10, 2014, 6 pages.

Non-Final Office Action dated Dec. 18, 2013, issued in connection with U.S. Appl. No. 13/907,666, filed May 31, 2013, 12 pages.

Non-Final Office Action dated Jan. 18, 2008, issued in connection with U.S. Appl. No. 10/816,217, filed Apr. 1, 2004, 38 pages.

Non-Final Office Action dated Apr. 19, 2010, issued in connection with U.S. Appl. No. 11/801,468, filed May 9, 2007, 16 pages.

Non-Final Office Action dated Mar. 19, 2013, issued in connection with U.S. Appl. No. 13/724,048, filed Dec. 21, 2012, 9 pages.

Non-Final Office Action dated Jun. 21, 2011, issued in connection with U.S. Appl. No. 10/816,217, filed Apr. 1, 2004, 13 pages.

Non-Final Office Action dated Jan. 22, 2009, issued in connection with U.S. Appl. No. 10/816,217, filed Apr. 1, 2004, 18 pages.

Non-Final Office Action dated Jul. 23, 2014, issued in connection with U.S. Appl. No. 14/256,434, filed Apr. 18, 2014, 12 pages.

Non-Final Office Action dated Jul. 25, 2014, issued in connection with U.S. Appl. No. 14/184,526, filed Feb. 19, 2014, 9 pages.

Non-Final Office Action dated Jul. 25, 2014, issued in connection with U.S. Appl. No. 14/184,935, filed Feb. 20, 2014, 11 pages.

Non-Final Office Action dated Jun. 25, 2010, issued in connection with U.S. Appl. No. 10/816,217, filed Apr. 1, 2004, 17 pages.

Non-Final Office Action dated Nov. 25, 2013, issued in connection with U.S. Appl. No. 13/533,105, filed Jun. 26, 2012, 19 pages.

Notice of Allowance dated Jul. 2, 2015, issued in connection with U.S. Appl. No. 14/184,935, filed Feb. 20, 2014, 23 pages.

Notice of Allowance dated Jun. 2, 2014, issued in connection with U.S. Appl. No. 13/083,499, filed Apr. 8, 2011, 5 pages.

Notice of Allowance dated Sep. 3, 2015, issued in connection with U.S. Appl. No. 13/705,174, filed Dec. 5, 2012, 4 pages.

Notice of Allowance dated Aug. 4, 2015, issued in connection with U.S. Appl. No. 14/516,867, filed Oct. 17, 2014, 13 pages.

Notice of Allowance dated Dec. 5, 2014, issued in connection with U.S. Appl. No. 14/256,434, filed Apr. 18, 2014, 7 pages.

Notice of Allowance dated Oct. 5, 2012, issued in connection with U.S. Appl. No. 13/204,511, filed Aug. 5, 2011, 11 pages.

Notice of Allowance dated Mar. 6, 2014, issued in connection with U.S. Appl. No. 13/827,653, filed Mar. 14, 2013, 17 pages.

Notice of Allowance dated May 6, 2011, issued in connection with U.S. Appl. No. 11/801,468, filed May 9, 2007, 10 pages.

Notice of Allowance dated Sep. 6, 2013, issued in connection with U.S. Appl. No. 13/619,237, filed Sep. 14, 2012, 10 pages.

Notice of Allowance dated Sep. 6, 2016, issued in connection with U.S. Appl. No. 15/134,767, filed Apr. 21, 2016, 7 pages.

Notice of Allowance dated Apr. 7, 2016, issued in connection with U.S. Appl. No. 13/533,105, filed Jun. 26, 2012, 40 pages.

Notice of Allowance dated Oct. 7, 2015, issued in connection with U.S. Appl. No. 14/184,526, filed Feb. 19, 2014, 7 pages.

Notice of Allowance dated Oct. 9, 2015, issued in connection with U.S. Appl. No. 13/435,739, filed Mar. 30, 2012, 4 pages.

Notice of Allowance dated Sep. 9, 2016, issued in connection with U.S. Appl. No. 15/134,761, filed Apr. 21, 2016, 7 pages.

Notice of Allowance dated Mar. 1, 2018, issued in connection with U.S. Appl. No. 14/619,813, filed Feb. 11, 2015, 7 pages.

Notice of Allowance dated Aug. 10, 2015, issued in connection with U.S. Appl. No. 13/848,904, filed Mar. 22, 2013, 9 pages.

Notice of Allowance dated Jul. 10, 2015, issued in connection with U.S. Appl. No. 13/013,740, filed Jan. 25, 2011, 7 pages.

Notice of Allowance dated Jun. 10, 2019, issued in connection with U.S. Appl. No. 16/128,443, filed Sep. 11, 2018, 10 pages.

Notice of Allowance dated Mar. 10, 2016, issued in connection with U.S. Appl. No. 14/937,523, filed Nov. 10, 2015, 5 pages.

Notice of Allowance dated Nov. 10, 2011, issued in connection with U.S. Appl. No. 11/906,702, filed Oct. 2, 2007, 17 pages.

Notice of Allowance dated Sep. 10, 2014, issued in connection with U.S. Appl. No. 13/892,230, filed May 10, 2013, 5 pages.

Notice of Allowance dated Sep. 10, 2018, issued in connection with U.S. Appl. No. 14/629,937, filed Feb. 24, 2015, 7 pages.

Notice of Allowance dated Apr. 11, 2016, issued in connection with U.S. Appl. No. 13/864,247, filed Apr. 17, 2013, 21 pages.

Notice of Allowance dated Jan. 11, 2016, issued in connection with U.S. Appl. No. 14/564,544, filed Dec. 9, 2014, 5 pages.

Notice of Allowance dated Jul. 11, 2017, issued in connection with U.S. Appl. No. 14/825,961, filed Aug. 13, 2015, 5 pages.

Notice of Allowance dated Aug. 12, 2015, issued in connection with U.S. Appl. No. 13/435,739, filed Mar. 30, 2012, 27 pages.

Notice of Allowance dated Jun. 12, 2014, issued in connection with U.S. Appl. No. 13/896,829, filed May 17, 2013, 5 pages.

Notice of Allowance dated Jul. 13, 2015, issued in connection with U.S. Appl. No. 14/184,526, filed Feb. 19, 2014, 22 pages.

Notice of Allowance dated May 13, 2015, issued in connection with U.S. Appl. No. 14/299,847, filed Jun. 9, 2014, 10 pages.

Notice of Allowance dated Nov. 13, 2013, issued in connection with U.S. Appl. No. 13/724,048, filed Dec. 21, 2012, 7 pages.

Notice of Allowance dated Nov. 13, 2017, issued in connection with U.S. Appl. No. 14/563,515, filed Dec. 8, 2014, 11 pages.

Notice of Allowance dated Oct. 13, 2015, issued in connection with U.S. Appl. No. 13/864,251, filed Apr. 17, 2013, 7 pages.

Notice of Allowance dated Jun. 14, 2012, issued in connection with U.S. Appl. No. 12/035,112, filed Feb. 21, 2008, 9 pages.

Notice of Allowance dated Jan. 15, 2019, issued in connection with U.S. Appl. No. 15/487,686, filed Apr. 14, 2017, 8 pages.

Notice of Allowance dated Jul. 15, 2015, issued in connection with U.S. Appl. No. 13/705,174, filed Dec. 5, 2012, 18 pages.

Notice of Allowance dated Mar. 15, 2016, issued in connection with U.S. Appl. No. 14/937,571, filed Nov. 10, 2015, 5 pages.

Notice of Allowance dated Jun. 16, 2009, issued in connection with U.S. Appl. No. 10/861,653, filed Jun. 5, 2004, 11 pages.

Notice of Allowance dated May 16, 2017, issued in connection with U.S. Appl. No. 15/228,685, filed Aug. 4, 2016, 10 pages.

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(56)

## References Cited

## OTHER PUBLICATIONS

Notice of Allowance dated Jul. 17, 2015, issued in connection with U.S. Appl. No. 13/864,251, filed Apr. 17, 2013, 20 pages.

Notice of Allowance dated Aug. 19, 2016, issued in connection with U.S. Appl. No. 14/619,813, filed Feb. 11, 2015, 9 pages.

Notice of Allowance dated May 19, 2015, issued in connection with U.S. Appl. No. 13/907,666, filed May 31, 2013, 7 pages.

Notice of Allowance dated Oct. 19, 2016, issued in connection with U.S. Appl. No. 14/290,493, filed May 29, 2014, 14 pages.

Notice of Allowance dated Jan. 20, 2016, issued in connection with U.S. Appl. No. 14/465,457, filed Aug. 21, 2014, 10 pages.

Notice of Allowance dated Oct. 21, 2015, issued in connection with U.S. Appl. No. 14/174,244, filed Feb. 6, 2014, 5 pages.

Notice of Allowance dated Oct. 21, 2015, issued in connection with U.S. Appl. No. 14/174,253, filed Feb. 6, 2014, 6 pages.

Notice of Allowance dated Sep. 21, 2015, issued in connection with U.S. Appl. No. 13/297,000, filed Nov. 15, 2011, 11 pages.

Notice of Allowance dated Jan. 22, 2015, issued in connection with U.S. Appl. No. 13/630,565, filed Sep. 28, 2012, 7 pages.

Notice of Allowance dated Sep. 22, 2015, issued in connection with U.S. Appl. No. 13/888,203, filed May 6, 2013, 7 pages.

Notice of Allowance dated May 24, 2017, issued in connection with U.S. Appl. No. 14/806,070, filed Jul. 22, 2015, 5 pages.

Notice of Allowance dated Oct. 24, 2016, issued in connection with U.S. Appl. No. 15/134,761, filed Apr. 21, 2016, 7 pages.

Hans et al., "Interacting with Audio Streams for Entertainment and Communication," Proceedings of the Eleventh ACM International Conference on Multimedia, ACM, 2003, 7 pages.

Herre et al., "The Reference Model Architecture for MPEG Spatial Audio Coding," Audio Engineering Society Convention Paper (Presented at the 118th Convention), May 28-31, 2005, 13 pages.

Home Networking with Universal Plug and Play, IEEE Communications Magazine, vol. 39 No. 12 (Dec. 2001) (D+M\_0402025-40) (16 pages).

"Home Theater Control Systems," Cinema Source, 2002, 19 pages.

Horwitz, Jeremy, "Logic3 i-Station25," retrieved from the internet: <http://www.ilounge.com/index.php/reviews/entry/logic3-i-station25/>, last visited Dec. 17, 2013, 5 pages.

Huang C.M., et al., "A Synchronization Infrastructure for Multicast Multimedia at the Presentation Layer," IEEE Transactions on Consumer Electronics, 1997, pp. 370-380, vol. 43, No. 3.

IBM Home Director Installation and Service Manual, Copyright 1998, 124 pages.

IBM Home Director Owner's Manual, Copyright 1999, 67 pages.

ID3 tag version 2.4.0—Native Frames, Draft Specification, copyright 2000, 41 pages.

*Implicit, LLC v. Sonos, Inc.*, Defendant's Original Complaint (Mar. 3, 2017) (15 pages).

Integra Audio Network Receiver NAC 2.3 Instruction Manual, 68 pages.

Integra Audio Network Server NAS 2.3 Instruction Manual, pp. 1-32.

Integra Service Manual, Audio Network Receiver Model NAC-2.3, Dec. 2002, 44 pages.

Intel Designing a UPnP AV Media Renderer, v. 1.0 ("Intel AV Media Renderer") (May 20, 2003) (SONDM000115117-62) (46 pages).

Intel Media Renderer Device Interface ("Intel Media Renderer") (Sep. 6, 2002) (62 pages).

Intel SDK for UPnP Devices Programming Guide, Version 1.2.1, (Nov. 2002) (30 pages).

International Bureau, International Preliminary Report on Patentability dated Jan. 8, 2015, issued in connection with International Application No. PCT/US2013/046372, filed on Jun. 18, 2013, 6 pages.

International Bureau, International Preliminary Report on Patentability, dated Jan. 8, 2015, issued in connection with International Application No. PCT/US2013/046386, filed on Jun. 18, 2013, 8 pages.

International Bureau, International Preliminary Report on Patentability, dated Oct. 17, 2013, issued in connection with International Application No. PCT/IB2012/052071, filed on Apr. 26, 2012, 7 pages.

International Bureau, International Preliminary Report on Patentability dated Jan. 30, 2014, issued in connection with International Application No. PCT/US2012/045894, filed on Jul. 9, 2012, 6 pages.

International Searching Authority, International Search Report dated Aug. 1, 2008, in connection with International Application No. PCT/US2004/023102, 5 pages.

International Searching Authority, International Search Report dated Aug. 23, 2012, issued in connection with International Application No. PCT/IB2012/052071, filed on Apr. 26, 2012, 3 pages.

International Searching Authority, International Search Report dated Aug. 26, 2013, issued in connection with International Application No. PCT/US2013/046372, filed on Jun. 18, 2013, 3 pages.

International Searching Authority, International Search Report dated Dec. 26, 2012, issued in connection with International Application No. PCT/US2012/045894, filed on Jul. 9, 2012, 3 pages.

International Searching Authority, International Search Report dated Sep. 30, 2013, issued in connection with International Application No. PCT/US2013/046386, filed on Jun. 18, 2013, 3 pages.

International Searching Authority, Written Opinion dated Aug. 23, 2012, issued in connection with International Application No. PCT/IB2012/052071, filed on Apr. 26, 2012, 6 pages.

International Searching Authority, Written Opinion dated Aug. 26, 2013, issued in connection with International Application No. PCT/US2013/046372, filed on Jun. 18, 2013, 4 pages.

International Searching Authority, Written Opinion dated Dec. 26, 2012, issued in connection with International Application No. PCT/US2012/045894, filed on Jul. 9, 2012, 4 pages.

International Searching Authority, Written Opinion dated Sep. 30, 2013, issued in connection with International Application No. PCT/US2013/046386, filed on Jun. 18, 2013, 6 pages.

Ishibashi et al., "A Comparison of Media Synchronization Quality Among Reactive Control Schemes," IEEE Infocom, 2001, pp. 77-84.

Ishibashi et al., "A Group Synchronization Mechanism for Live Media in Multicast Communications," IEEE Global Telecommunications Conference, 1997, pp. 746-752, vol. 2.

Ishibashi et al., "A Group Synchronization Mechanism for Stored Media in Multicast Communications," IEEE Information Revolution and Communications, 1997, pp. 692-700, vol. 2.

Issues with Mixed IEEE 802.b/802.11g Networks, AVAGO0058, Agere Systems, Feb. 2004, 5 pages.

Japanese Patent Office, Decision of Rejection dated Jul. 8, 2014, issued in connection with Japanese Patent Application No. 2012-178711, 3 pages.

Japanese Patent Office, Final Office Action dated Jun. 4, 2019, issued in connection with Japanese Patent Application No. 2017-211958, 8 pages.

Japanese Patent Office, Notice of Rejection, dated Feb. 3, 2015, issued in connection with Japanese Patent Application No. 2014-521648, 7 pages.

Japanese Patent Office, Notice of Rejection dated Sep. 15, 2015, issued in connection with Japanese Patent Application No. 2014-220704, 7 pages.

Japanese Patent Office, Office Action dated Nov. 1, 2016, issued in connection with Japanese Application No. 2015-238682, 7 pages.

Japanese Patent Office, Office Action dated Jan. 6, 2015, issued in connection with Japanese Patent Application No. 2014-503273, 5 pages.

Japanese Patent Office, Office Action Dec. 18, 2018, issued in connection with Japanese Application No. 2017-211958, 8 pages.

Japanese Patent Office, Office Action dated May 24, 2016, issued in connection with Japanese Patent Application No. 2014-220704, 7 pages.

Japanese Patent Office, Office Action dated Mar. 29, 2016, issued in connection with Japanese Patent Application No. JP2015-520288, 12 pages.

## US 10,469,966 B2

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(56)

## References Cited

## OTHER PUBLICATIONS

Japanese Patent Office, Office Action Summary dated Feb. 2, 2016, issued in connection with Japanese Patent Application No. 2015-520286, 6 pages.

Japanese Patent Office, Office Action Summary dated Sep. 8, 2015, issued in connection with Japanese Patent Application No. 2014-503273, 4 pages.

Japanese Patent Office, Office Action Summary dated Nov. 2013, issued in connection with Japanese Patent Application No. 2012-178711, 5 pages.

Japanese Patent Office, Translation of Office Action dated Dec. 18, 2018, issued in connection with Japanese Application No. 2017-211958, 6 pages.

Jo et al., "Synchronized One-to-many Media Streaming with Adaptive Playout Control," Proceedings of SPIE, 2002, pp. 71-82, vol. 4861.

Jones, Stephen, "Dell Digital Audio Receiver: Digital upgrade for your analog stereo," Analog Stereo, Jun. 24, 2000 retrieved Jun. 18, 2014, 2 pages.

Kou et al., "RenderingControl:1 Service Template Verion 1.01," Contributing Members of the UPnP Forum, Jun. 25, 2002, 63 pages.

Lake Processors: Lake® LM Series Digital Audio Processors Operation Manual, 2011, 71 pages.

Reid, Mark, "Multimedia conferencing over ISDN and IP networks using ITU-T H-series recommendations: architecture, control and coordination," Computer Networks, 1999, pp. 225-235, vol. 31.

RenderingControl:1 Service Template Version 1.01 for UPnP, Version 1.0, (Jun. 25, 2002) (SONDM000115187-249) (63 pages).

Renewed Request for Ex Parte Re-Examination, U.S. Appl. No. 90/013,959 filed Jun. 16, 2017, 126 pages.

Renkus Heinz Manual; available for sale at least 2004, 6 pages.

Request for Ex Parte Reexamination submitted in U.S. Pat. No. 9,213,357 on May 22, 2017, 85 pages.

"Residential Distributed Audio Wiring Practices," Leviton Network Solutions, 2001, 13 pages.

Ritchie et al., "MediaServer:1 Device Template Version 1.01," Contributing Members of the UPnP Forum, Jun. 25, 2002, 12 pages.

Ritchie et al., "UPnP AV Architecture:1, Version 1.0," Contributing Members of the UPnP Forum, Jun. 25, 2002, 22 pages.

Ritchie, John, "MediaRenderer:1 Device Template Version 1.01," Contributing Members of the UPnP Forum, Jun. 25, 2002, 12 pages.

Roland Corporation, "Roland announces BA-55 Portable PA System," press release, Apr. 6, 2011, 2 pages.

Rothermel et al., "An Adaptive Protocol for Synchronizing Media Streams," Institute of Parallel and Distributed High-Performance Systems (IPVR), 1997, 26 pages.

Rothermel et al., "An Adaptive Stream Synchronization Protocol," 5th International Workshop on Network and Operating System Support for Digital Audio and Video, 1995, 13 pages.

Rothermel et al., "An Adaptive Stream Synchronization Protocol," 5th International Workshop on Network and Operating System Support for Digital Audio and Video, Apr. 18-21, 1995, 12 pages.

Rothermel et al., "Clock Hierarchies—An Abstraction for Grouping and Controlling Media Streams," University of Stuttgart Institute of Parallel and Distributed High-Performance Systems, Jan. 1996, 23 pages.

Rothermel et al., "Synchronization in Joint-Viewing Environments," University of Stuttgart Institute of Parallel and Distributed High-Performance Systems, 1992, 13 pages.

Rothermel, Kurt, "State-of-the-Art and Future Research in Stream Synchronization," University of Stuttgart, 3 pages.

"RVL-6 Modular Multi-Room Controller, Installation & Operation Guide," Nile Audio Corporations, 1999, 46 pages.

Schmandt et al., "Impromptu: Managing Networked Audio Applications for Mobile Users," 2004, 11 pages.

Schulzrinne et al., "RTP: A Transport Protocol for Real-Time Applications," Network Working Group, RFC: 3550, Standards Track, Jul. 2003, 104 pages.

Schulzrinne H., et al., "RTP: A Transport Protocol for Real-Time Applications, RFC 3550," Network Working Group, 2003, pp. 1-89.

Simple Network Time Protocol (SNTP), RFC 1361 (Aug. 1992) (D+M\_0397537-46) (10 pages).

Simple Network Time Protocol (SNTP), RFC 1769 (Mar. 1995) (D+M\_0397663-76) (14 pages).

Simple Service Discovery Protocol/1.0 Operating without an Arbiter (Oct. 28, 1999) (24 pages).

Sonos Controller for iPad Product Guide; copyright 2004-2013; 47 pages.

Sonos Digital Music System User Guide, Version: 050801, Aug. 2005, 114 pages.

*Sonos, Inc. v. D&M Holdings*, D&M Supp Opposition Brief including Exhibits, Mar. 17, 2017, 23 pages.

*Sonos, Inc. v. D&M Holdings*, Expert Report of Jay P. Kesan including Appendices A-P, Feb. 20, 2017, 776 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Complaint for Patent Infringement, filed Oct. 21, 2014, 20 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Invalidity Contentions, filed Sep. 14, 2016, 100 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Initial Invalidity Contentions, filed Apr. 15, 2016, 97 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Preliminary Identification of Indefinite Terms, provided Jul. 29, 2016, 8 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendants' 35 U.S.C. § 282 Notice filed Nov. 2, 2017, 31 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendant's Amended Answer, Defenses, and Counterclaims for Patent Infringement, filed Nov. 30, 2015, 47 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendants' Answer to Plaintiff's Second Amended Complaint, filed Apr. 30, 2015, 19 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendants' First Amended Answer to Plaintiff's Third Amended Complaint, filed Sep. 7, 2016, 23 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Defendants' Reply in Support of Partial Motion for Judgement on the Pleadings, filed Jun. 10, 2016, 15 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Exhibit A: Defendants' First Amended Answer to Plaintiffs' Third Amended Complaint, provided Aug. 1, 2016, 26 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Exhibit A: Defendants' Second Amended Answer to Plaintiffs' Third Amended Complaint, filed Sep. 9, 2016, 43 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Exhibit A: Defendants' Second Amended Answer to Plaintiffs' Third Amended Complaint, provided Sep. 9, 2016, 88 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, First Amended Complaint for Patent Infringement, filed Dec. 17, 2014, 26 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Joint Claim Construction Chart, vol. 1 of 3 with Exhibits A-O, filed Aug. 17, 2016, 30 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Opening Brief in Support of Defendants' Partial Motion for Judgement on the Pleadings for Lack of Patent-Eligible Subject Matter, filed May 6, 2016, 27 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Plaintiff Sonos, Inc.'s Opening Claim Construction Brief, filed Sep. 9, 2016, 26 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Plaintiff Sonos, Inc.'s Response in Opposition to Defendants' Partial Motion for Judgment on the Pleadings, filed May 27, 2016, 24 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Reply Brief in Support of Defendants' Motion for Leave to Amend their Answer to Add the Defense of Inequitable Conduct, provided Nov. 10, 2016, 16 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Reply Brief in Support of Defendants' Motion for Leave to Amend their Answer to Add the Defense of Inequitable Conduct, provided Sep. 9, 2016, 16 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Second Amended Complaint for Patent Infringement, filed Feb. 27, 2015, 49 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Sonos's Motion to Strike Defendants' New Amended Answer Submitted with their Reply Brief, provided Sep. 15, 2016, 10 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Sonos's Opposition to Defendants' Motion for Leave to Amend their Answer to Add the Defense of Inequitable Conduct, provided Oct. 31, 2016, 26 pages.

*Sonos, Inc. v. D&M Holdings Inc. et al.*, Third Amended Complaint for Patent Infringement, filed Jan. 29, 2016, 47 pages.



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(56) **References Cited**

## OTHER PUBLICATIONS

Final Office Action dated Mar. 27, 2014, issued in connection with U.S. Appl. No. 13/533,105, filed Jun. 26, 2012, 29 pages.

Final Office Action dated Jan. 28, 2011, issued in connection with U.S. Appl. No. 10/816,217, filed Apr. 1, 2004, 21 pages.

Final Office Action dated Jun. 30, 2008, issued in connection with U.S. Appl. No. 10/816,217, filed Apr. 1, 2004, 30 pages.

Final Office Action dated Jul. 1, 2016, issued in connection with U.S. Appl. No. 13/458,558, filed Apr. 27, 2012, 11 pages.

Final Office Action dated Jul. 2, 2015, issued in connection with U.S. Appl. No. 13/458,558, filed Apr. 27, 2012, 11 pages.

Final Office Action dated Aug. 3, 2015, issued in connection with U.S. Appl. No. 13/848,921, filed Mar. 22, 2013, 13 pages.

Final Office Action dated Dec. 3, 2014, issued in connection with U.S. Appl. No. 14/184,528, filed Feb. 19, 2014, 12 pages.

Final Office Action dated Jul. 3, 2012, issued in connection with U.S. Appl. No. 13/298,090, filed Nov. 16, 2011, 46 pages.

Final Office Action dated Jun. 3, 2016, issued in connection with U.S. Appl. No. 13/705,176, filed Dec. 5, 2012, 24 pages.

Final Office Action dated Mar. 3, 2015, issued in connection with U.S. Appl. No. 13/864,251, filed Apr. 17, 2013, 13 pages.

Final Office Action dated Mar. 4, 2015, issued in connection with U.S. Appl. No. 13/848,904, filed Mar. 22, 2013, 16 pages.

Final Office Action dated Mar. 5, 2015, issued in connection with U.S. Appl. No. 13/888,203, filed May 6, 2013, 13 pages.

Final Office Action dated Jan. 7, 2017, issued in connection with U.S. Appl. No. 13/848,932, filed Mar. 22, 2013, 14 pages.

Final Office Action dated Mar. 9, 2015, issued in connection with U.S. Appl. No. 14/516,867, filed Oct. 17, 2014, 14 pages.

Final Office Action dated Aug. 10, 2015, issued in connection with U.S. Appl. No. 14/290,493, filed May 29, 2014, 26 pages.

Final Office Action dated Feb. 10, 2014, issued in connection with U.S. Appl. No. 13/013,740, filed Jan. 25, 2011, 13 pages.

Final Office Action dated Aug. 11, 2015, issued in connection with U.S. Appl. No. 13/864,247, filed Apr. 17, 2013, 15 pages.

Final Office Action dated Feb. 11, 2015, issued in connection with U.S. Appl. No. 14/184,526, filed Feb. 19, 2014, 13 pages.

Final Office Action dated Feb. 11, 2015, issued in connection with U.S. Appl. No. 14/184,935, filed Feb. 20, 2014, 17 pages.

Final Office Action dated Feb. 12, 2015, issued in connection with U.S. Appl. No. 14/184,522, filed Feb. 17, 2014, 20 pages.

Final Office Action dated Apr. 13, 2017, issued in connection with U.S. Appl. No. 14/563,515, filed Dec. 8, 2014, 13 pages.

Final Office Action dated Dec. 13, 2016, issued in connection with U.S. Appl. No. 14/629,937, filed Feb. 24, 2015, 14 pages.

Final Office Action dated Oct. 13, 2011, issued in connection with U.S. Appl. No. 11/853,790, filed Sep. 11, 2007, 10 pages.

Final Office Action dated Oct. 13, 2011, issued in connection with U.S. Appl. No. 12/035,112, filed Feb. 21, 2008, 10 pages.

Final Office Action dated Nov. 14, 2018, issued in connection with U.S. Appl. No. 15/130,919, filed Apr. 15, 2016, 12 pages.

Final Office Action dated Jul. 15, 2015, issued in connection with U.S. Appl. No. 14/504,812, filed Oct. 2, 2014, 18 pages.

Final Office Action dated Jun. 15, 2015, issued in connection with U.S. Appl. No. 14/184,522, filed Feb. 19, 2014, 25 pages.

Final Office Action dated Dec. 17, 2014, issued in connection with U.S. Appl. No. 13/533,105, filed Jun. 26, 2012, 36 pages.

Final Office Action dated Oct. 19, 2016, issued in connection with U.S. Appl. No. 13/848,921, filed Mar. 22, 2013, 14 pages.

Final Office Action dated Jan. 21, 2010, issued in connection with U.S. Appl. No. 11/906,702, filed Oct. 2, 2007, 27 pages.

Final Office Action dated Oct. 22, 2014, issued in connection with U.S. Appl. No. 14/186,850, filed Feb. 21, 2014, 12 pages.

Final Office Action dated Oct. 23, 2014, issued in connection with U.S. Appl. No. 13/705,176, filed Dec. 5, 2012, 23 pages.

Final Office Action dated Feb. 24, 2016, issued in connection with U.S. Appl. No. 13/871,795, filed Mar. 26, 2013, 28 pages.

Final Office Action dated May 25, 2016, issued in connection with U.S. Appl. No. 14/290,493, filed May 29, 2014, 33 pages.

Final Office Action dated Apr. 28, 2015, issued in connection with U.S. Appl. No. 14/186,850, filed Feb. 21, 2014, 20 pages.

Final Office Action dated Jun. 29, 2015, issued in connection with U.S. Appl. No. 14/465,457, filed Aug. 21, 2014, 13 pages.

Final Office Action dated Jan. 3, 2019, issued in connection with U.S. Appl. No. 15/405,931, filed Jan. 13, 2017, 16 pages.

Final Office Action dated Nov. 30, 2015, issued in connection with U.S. Appl. No. 13/871,795, filed Apr. 26, 2013, 26 pages.

Final Office Action dated Apr. 6, 2017, issued in connection with U.S. Appl. No. 14/620,937, filed Feb. 12, 2015, 15 pages.

Final Office Action dated Dec. 7, 2017, issued in connection with U.S. Appl. No. 14/619,813, filed Feb. 11, 2015, 11 pages.

Fireball DVD and Music Manager DVDM-100 Installation and User's Guide, Copyright 2003, 185 pages.

Fireball MP-200 User's Manual, Copyright 2006, 93 pages.

Fireball Remote Control Guide WD006-1-1, Copyright 2003, 19 pages.

Fireball SE-D1 User's Manual, Copyright 2005, 90 pages.

First Action Interview Office Action Summary dated Apr. 15, 2015, issued in connection with U.S. Appl. No. 14/505,027, filed Oct. 2, 2014, 6 pages.

Fober et al., "Clock Skew Compensation over a High Latency Network," Proceedings of the ICMC, 2002, pp. 548-552.

Fries et al., "The MP3 and Internet Audio Handbook: Your Guide to the Digital Music Revolution." 2000, 320 pages.

Fulton et al., "The Network Audio System: Make Your Application Sing (as Well as Dance)!" The X Resource, 1994, 14 pages.

Gaston et al., "Methods for Sharing Stereo and Multichannel Recordings Among Planetariums," Audio Engineering Society Convention Paper 7474, 2008, 15 pages.

General Event Notification Architecture Base: Client to Arbiter (Apr. 2000) (23 pages).

Sony: AIR-SA 50R Wireless Speaker, Copyright 2009, 2 pages.

Sony: Altus Quick Setup Guide ALT-SA32PC, Copyright 2009, 2 pages.

Sony: BD/DVD Home Theatre System Instruction for BDV-E300, E301 and E801, Copyright 2009, 115 pages.

Sony: BD/DVD Home Theatre System Operating Instructions for BDV-IT1000/BDV-IS1000, Copyright 2008, 159 pages.

Sony: Blu-ray Disc/DVD Home Theatre System Operating Instructions for BDV-IZ1000W, Copyright 2010, 88 pages.

Sony: DVD Home Theatre System Operating Instructions for DAV-DZ380W/DZ680W/DZ880W, Copyright 2009, 136 pages.

Sony: DVD Home Theatre System Operating Instructions for DAV-DZ870W, Copyright 2008, 128 pages.

Sony Ericsson MS500 User Guide, Copyright 2009, 2 pages.

Sony: Home Theatre System Operating Instructions for HT-IS100, Copyright 2008, 168 pages.

Sony HT-IS100, 5.1 Channel Audio System, last updated Nov. 2009, 2 pages.

Sony: Multi Channel AV Receiver Operating Instructions, 2007, 80 pages.

Sony: Multi Channel AV Receiver Operating Instructions for STR-DN1000, Copyright 2009, 136 pages.

Sony: STR-DN1000, Audio Video Receiver, last updated Aug. 2009, 2 pages.

Sony: Wireless Surround Kit Operating Instructions for WHAT-SA2, Copyright 2010, 56 pages.

Taylor, Marilou, "Long Island Sound," Audio Video Interiors, Apr. 2000, 8 pages.

Third Party Request for Ex Parte Re-Examination, U.S. Appl. No. 90/013,859 filed Nov. 7, 2016, 424 pages.

TOA Corporation, Digital Processor DP-0206 DACsys2000 Version 2.00 Software Instruction Manual, Copyright 2001, 67 pages.

Understanding Universal Plug and Play, Microsoft White Paper (Jun. 2000) (D+M\_0402074-118) (45 pages).

United States Patent and Trademark Office, U.S. Appl. No. 60/490,768, filed Jul. 28, 2003, entitled "Method for synchronizing audio playback between multiple networked devices," 13 pages.

United States Patent and Trademark Office, U.S. Appl. No. 60/825,407, filed Sep. 12, 2006, entitled "Controlling and manipulating groupings in a multi-zone music or media system," 82 pages.

## US 10,469,966 B2

Page 17

(56)

## References Cited

## OTHER PUBLICATIONS

Universal Plug and Play Device Architecture V. 1.0, (Jun. 8, 2000) (54 pages).

Universal Plug and Play in Windows XP, Tom Fout. Microsoft Corporation (Jul. 2001) (D+M\_0402041-73) (33 pages).

Universal Plug and Play ("UPnP") AV Architecture:1 for UPnP, Version 1.0, (Jun. 25, 2002) (D+M\_0298151-72) (22 pages).

Universal Plug and Play Vendor's Implementation Guide (Jan. 5, 2000) (7 pages).

UPnP AV Architecture:0.83 (Jun. 12, 2002) (SONDM000115483-504) (22 pages).

UPnP Design by Example, A Software Developers Guide to Universal Plug and Play Michael Jeronimo and JackWeast, Intel Press (D+M\_0401307-818) (Apr. 2003) (511 pages).

UPnP; "Universal Plug and Play Device Architecture," Jun. 8, 2000; version 1.0; Microsoft Corporation; pp. 1-54.

U.S. Appl. No. 13/083,499, filed Apr. 8, 2011, "Multi-Channel Pairing in a Media System."

WANCommonInterfaceConfig:1 Service Template Version 1.01 for UPnP, Ver. 1.0 (Nov. 12, 2001) (D+M\_0401820-43) (24 pages).

WANIPConnection:1 Service Template Version 1.01 for UPnP Ver. 1.0 (Nov. 12, 2001) (D+M\_0401844-917) (74 pages).

WANPPPConnection:1 Service Template Version 1.01 for UPnP, Version 1.0 (Nov. 12, 2001) (D+M\_0401918-2006) (89 pages).

WaveLan High-Speed Multimode Chip Set, AVAGO0003, Agere Systems, Feb. 2003, 4 pages.

WaveLan High-Speed Multimode Chip Set, AVAGO0005, Agere Systems, Feb. 2003, 4 pages.

WaveLAN Wireless Integration Developer Kit (WI-DK) for Access Point Developers, AVAGO0054, Agere Systems, Jul. 2003, 2 pages.

WaveLAN Wireless Integration-Developer Kit (WI-DK) Hardware Control Function (HCF), AVAGO0052, Agere Systems, Jul. 2003, 2 pages.

"Welcome. You're watching Apple TV." Apple TV 1st Generation Setup Guide, Apr. 8, 2008 Retrieved Oct. 14, 2014, 40 pages.

"Welcome. You're watching Apple TV." Apple TV 2nd Generation Setup Guide, Mar. 10, 2011 Retrieved Oct. 16, 2014, 36 pages.

"Welcome. You're watching Apple TV." Apple TV 3rd Generation Setup Guide, Mar. 16, 2012 Retrieved Oct. 16, 2014, 36 pages.

WI-DK Release 2 WaveLan Embedded Drivers for VxWorks and Linux, AVAGO0056, Agere Systems, Jul. 2003, 2 pages.

WI-DK Release 2 WaveLan END Reference Driver for VxWorks, AVAGO0044, Agere Systems, Jul. 2003, 4 pages.

WI-DK Release 2 WaveLan LKM Reference Drivers for Linux, AVAGO0048, Agere Systems, Jul. 2003, 4 pages.

Windows Media Connect Device Compatibility Specification (Apr. 12, 2004) (16 pages).

WPA Reauthentication Rates, AVAGO0063, Agere Systems, Feb. 2004, 3 pages.

Yamaha DME 32 manual: copyright 2001.

Yamaha DME 64 Owner's Manual; copyright 2004, 80 pages.

Yamaha DME Designer 3.5 setup manual guide; copyright 2004, 16 pages.

Yamaha DME Designer 3.5 User Manual; Copyright 2004, 507 pages.

Yamaha DME Designer software manual: Copyright 2004, 482 pages.

"Symantec pcAnywhere User's Guide," v 10.5.1, 1995-2002, 154 pages.

"Systemline Modular Installation Guide, Multiroom System," Systemline, 2003, pp. 1-22.

"884+ Automatic Matrix Mixer Control System," Ivie Technologies, Inc., 2000, pp. 1-4.

Advanced Driver Tab User Interface WaveLan GUI Guide, AVAGO0009, Agere Systems, Feb. 2004, 4 pages.

Advisory Action dated Feb. 2, 2016, issued in connection with U.S. Appl. No. 13/848,921, filed Mar. 22, 2013, 8 pages.

Advisory Action dated Sep. 18, 2008, issued in connection with U.S. Appl. No. 10/816,217, filed Apr. 1, 2004, 8 pages.

Advisory Action dated Feb. 1, 2016, issued in connection with U.S. Appl. No. 13/864,247, filed Apr. 17, 2013, 6 pages.

Advisory Action dated Jun. 1, 2015, issued in connection with U.S. Appl. No. 14/516,867, filed Oct. 17, 2014, 11 pages.

Advisory Action dated Mar. 2, 2015, issued in connection with U.S. Appl. No. 13/848,932, filed Mar. 22, 2013, 3 pages.

Advisory Action dated Jan. 5, 2012, issued in connection with U.S. Appl. No. 12/035,112, filed Feb. 21, 2008, 3 pages.

Advisory Action dated Oct. 5, 2015, issued in connection with U.S. Appl. No. 13/458,558, filed Apr. 27, 2012, 4 pages.

Advisory Action dated Sep. 5, 2014, issued in connection with U.S. Appl. No. 13/907,666, filed May 31, 2013, 3 pages.

Advisory Action dated Oct. 6, 2016, issued in connection with U.S. Appl. No. 13/458,558, filed Apr. 27, 2012, 4 pages.

Advisory Action dated Jan. 8, 2015, issued in connection with U.S. Appl. No. 13/705,176, filed Dec. 5, 2012, 4 pages.

Advisory Action dated Jun. 9, 2016, issued in connection with U.S. Appl. No. 13/871,795, filed Apr. 25, 2013, 3 pages.

Advisory Action dated Feb. 10, 2016, issued in connection with U.S. Appl. No. 13/871,795, filed Apr. 26, 2013, 3 pages.

Advisory Action dated Nov. 12, 2014, issued in connection with U.S. Appl. No. 13/907,666, filed May 31, 2013, 6 pages.

Advisory Action dated Apr. 15, 2015, issued in connection with U.S. Appl. No. 14/184,526, filed Feb. 19, 2014, 9 pages.

Advisory Action dated Apr. 15, 2015, issued in connection with U.S. Appl. No. 14/184,935, filed Feb. 20, 2014, 9 pages.

Advisory Action dated Dec. 22, 2011, issued in connection with U.S. Appl. No. 11/853,790, filed Sep. 11, 2007, 2 pages.

Advisory Action dated Mar. 25, 2015, issued in connection with U.S. Appl. No. 13/533,105, filed Jun. 26, 2012, 5 pages.

Advisory Action dated Feb. 26, 2015, issued in connection with U.S. Appl. No. 14/184,528, filed Feb. 19, 2014, 3 pages.

Advisory Action dated Nov. 26, 2014, issued in connection with U.S. Appl. No. 14/186,850, filed Feb. 21, 2014, 9 pages.

Advisory Action dated Jul. 28, 2015, issued in connection with U.S. Appl. No. 14/184,522, filed Feb. 19, 2014, 7 pages.

Advisory Action dated Sep. 28, 2009, issued in connection with U.S. Appl. No. 10/816,217, filed Apr. 1, 2004, 4 pages.

Agere Systems' Voice-over-Wireless LAN (VoWLAN) Station Quality of Service, AVAGO0015, Agere Systems, Jan. 2005, 5 pages.

Akyildiz et al., "Multimedia Group Synchronization Protocols for Integrated Services Networks," IEEE Journal on Selected Areas in Communications, 1996 pp. 162-173, vol. 14, No. 1.

Anonymous, "Information technology—Generic coding of moving pictures and associated audio information—Part 3: Audio," ISO/IEC 13818-3, Apr. 1998, pp. 11.

Anonymous, "Transmission Control Protocol," RFC: 793, USC/Information Sciences Institute, Sep. 1981, 91 pages.

Audio Authority: How to Install and Use the Model 1154 Signal Sensing Auto Selector, 2002, 4 pages.

Audio Authority: Model 1154B High Definition AV Auto Selector, 2008, 8 pages.

AudioSource: AMP 100 User Manual, 2003, 4 pages.

AudioTron Quick Start Guide, Version 1.0, Mar. 2001, 24 pages.

AudioTron Reference Manual, Version 3.0, May 2002, 70 pages.

AudioTron Setup Guide, Version 3.0, May 2002, 38 pages.

Automatic Profile Hunting Functional Description, AVAGO0013, Agere Systems, Feb. 2004, 2 pages.

"A/V Surround Receiver AVR-5800," Denon Electronics, 2000, 2 pages.

"A/V System Controleer, Owner's Manual," B&K Components, Ltd., 1998, 52 pages.

AVTransport:1 Service Template Version 1.01 for UPnP, Version 1.0 (Jun. 25, 2002) (66 pages).

AXIS Communication: AXIS P8221 Network I/O Audio Module, 2009, 41 pages.

Baldwin, Roberto. "How-To: Setup iTunes DJ on Your Max and iPhone", available at [http://www.maclife.com/article/howtos/howto\\_setup\\_itunes\\_dj\\_your\\_mac\\_and\\_iphone](http://www.maclife.com/article/howtos/howto_setup_itunes_dj_your_mac_and_iphone), archived on Mar. 3, 2009, 4 pages.

Balfanz et al., "Network-in-a-Box: How to Set Up a Secure Wireless Network in Under a Minute," 13th USENIX Security Symposium—Technical Paper, 2002, 23 pages.



## US 10,469,966 B2

Page 18

(56)

## References Cited

## OTHER PUBLICATIONS

Balfanz et al., "Talking to Strangers: Authentication in Ad-Hoc Wireless Networks," Xerox Palo Alto Research Center, 2002, 13 pages.

Barham et al., "Wide Area Audio Synchronisation," University of Cambridge Computer Laboratory, 1995, 5 pages.

Baudisch et al., "Flat Volume Control: Improving Usability by Hiding the Volume Control Hierarchy in the User Interface," 2004, 8 pages.

Benslimane Abderrahim, "A Multimedia Synchronization Protocol for Multicast Groups," Proceedings of the 26th Euromicro Conference, 2000, pp. 456-463, vol. 1.

Biersack et al., "Intra- and Inter-Stream Synchronization for Stored Multimedia Streams," IEEE International Conference on Multimedia Computing and Systems, 1996, pp. 372-381.

Blakowski G. et al., "A Media Synchronization Survey: Reference Model, Specification, and Case Studies," Jan. 1996, pp. 5-35, vol. 14, No. 1.

Bluetooth. "Specification of the Bluetooth System: The ad hoc SCATTERNET for affordable and highly functional wireless connectivity," Core, Version 1.0 A, Jul. 26, 1999, 1068 pages.

Bluetooth. "Specification of the Bluetooth System: Wireless connections made easy," Core, Version 1.0 B, Dec. 1, 1999, 1076 pages.

Bogen Communications, Inc., ProMatrix Digitally Matrixed Amplifier Model PM3180, Copyright1996, 2 pages.

Brassil et al., "Enhancing Internet Streaming Media with Cueing Protocols," 2000, 9 pages.

Breebaart et al., "Multi-Channel Goes Mobile: MPEG Surround Binaural Rendering," AES 29th International Conference, Sep. 2-4, 2006, pp. 1-13.

Bretl W.E., et al., MPEG2 Tutorial [online], 2000 [retrieved on Jan. 13, 2009] Retrieved from the Internet:(<http://www.bretl.com/mpeghtml/MPEGIndex.htm>), pp. 1-23.

Buerk et al., "AVTransport:1 Service Template Version 1.01," Contributing Members of the UPnP Forum, Jun. 25, 2002, 67 pages.

Canadian Intellectual Property Office, Canadian Office Action dated Apr. 4, 2016, issued in connection with Canadian Patent Application No. 2,842,342, 5 pages.

Canadian Intellectual Property Office, Canadian Office Action dated Sep. 14, 2015, issued in connection with Canadian Patent Application No. 2,842,342, 2 pages.

Canadian Patent Office, Canadian Office Action dated Aug. 30, 2017, issued in connection with CA Application No. 2947275, 5 pages.

Canadian Patent Office, Office Action dated Apr. 10, 2015, issued in connection with Canadian Patent Application No. 2,832,542, 3 pages.

Cen et al., "A Distributed Real-Time MPEG Video Audio Player," Department of Computer Science and Engineering, Oregon Graduate Institute of Science and Technology, 1995, 12 pages.

Chakrabarti et al., "A Remotely Controlled Bluetooth Enabled Environment," IEEE, 2004, pp. 77-81.

Change Notification: Agere Systems WaveLan Multimode Reference Design (D2 to D3), AVAGO0042, Agere Systems, Nov. 2004, 2 pages.

Chinese Patent Office, First Office Action dated Oct. 12, 2018, issued in connection with Chinese Application No. 201610804134.8, 10 pages.

Chinese Patent Office, Office Action dated Jul. 5, 2016, issued in connection with Chinese Patent Application No. 201380044380.2, 25 pages.

Chinese Patent Office, Office Action dated Nov. 27, 2015, issued in connection with Chinese Patent Application No. 201280028038.9, 26 pages.

Connection Manager: 1 Service Template Version 1.01 for UPnP, Version 1.0 (Jun. 25, 2002) (25 pages).

ContentDirectory:1 Service Template Version 1.01 for UPnP, Version 1.0 (Jun. 25, 2002) (89 pages).

Corrected Notice of Allowance dated Mar. 12, 2015, issued in connection with U.S. Appl. No. 13/630,565, filed Sep. 28, 2012, 4 pages.

Corrected Notice of Allowance dated Aug. 19, 2015, issued in connection with U.S. Appl. No. 13/907,666, filed May 31, 2013, 2 pages.

Corrected Notice of Allowance dated Oct. 30, 2015, issued in connection with U.S. Appl. No. 13/013,740, filed Jan. 25, 2011, 2 pages.

Corrected Notice of Allowance dated Dec. 6, 2017, issued in connection with U.S. Appl. No. 15/228,685, filed Aug. 4, 2016, 5 pages.

Creative, "Connecting Bluetooth Devices with Creative D200," <http://support.creative.com/kb/ShowArticle.aspx?url=http://ask.creative.com:80/SRVS/CGI-BIN/WEB CGI.EXE/./?St=106,E=000000000396859016,K=9377,Sxi=8,VARSET=ws:http://us.creative.com,case=63350>, available on Nov. 28, 2011, 2 pages.

Crown PIP Manual available for sale at least 2004, 68 pages.

Dannenberg et al., "A. System Supporting Flexible Distributed Real-Time Music Processing," Proceedings of the 2001 International Computer Music Conference, 2001, 4 pages.

Dannenberg, Roger B., "Remote Access to Interactive Media," Proceedings of the SPIE 1785, 1993, pp. 230-237.

Day, Rebecca, "Going Elan!" Primedia Inc., 2003, 4 pages.

Deep-Sleep Implementation in WL60011 for IEEE 802.11b Applications, AVAGO0020, Agere Systems, Jul. 2004, 22 pages.

Dell, Inc. "Dell Digital Audio Receiver: Reference Guide," Jun. 2000, 70 pages.

Dell, Inc. "Start Here," Jun. 2000, 2 pages.

"Denon 2003-2004 Product Catalog," Denon, 2003-2004, 44 pages.

Denon AV Surround Receiver AVR-1604/684 User's Manual, 2004, 128 pages.

Denon AV Surround Receiver AVR-5800 Operating Instructions, Copyright 2000, 67 pages.

Designing a UPnP AV MediaServer, Nelson Kidd (2003) (SONDM000115062-116) (55 pages).

Dorwaldt, Carl, "EASE 4.1 Tutorial," Renkus-Heinz, Inc., 2004, 417 pages.

"DP-0206 Digital Signal Processor," TOA Electronics, Inc., 2001, pp. 1-12.

Dynaudio Acoustics Air Series, <http://www.soundonsound.com/sos/sep02/articles/dynaudioair.asp>, 2002, 4 pages.

European Patent Office, European Extended Search Report dated Mar. 7, 2016, issued in connection with EP Application No. 13810340.3, 9 pages.

European Patent Office, European Extended Search Report dated Feb. 28, 2014, issued in connection with EP Application No. 13184747.7, 8 pages.

European Patent Office, European Extended Search Report dated Mar. 31, 2015, issued in connection with EP Application No. 14181454.1, 9 pages.

European Patent Office, European Search Report dated Jul. 5, 2016, issued in connection with European Patent Application No. 16156935.5, 9 pages.

European Patent Office, Examination Report dated Mar. 22, 2016, issued in connection with European Patent Application No. EP14181454.1, 6 pages.

European Patent Office, Examination Report dated Oct. 24, 2016, issued in connection with European Patent Application No. 13808623.6, 4 pages.

European Patent Office, Extended European Search Report dated Jul. 5, 2016, issued in connection with European Patent Application No. 16156940.5, 7 pages.

Falcone, John, "Sonos BU150 Digital Music System review," CNET, CNET [online] Jul. 27, 2009 [retrieved on Mar. 16, 2016], 11 pages Retrieved from the Internet: URL:<http://www.cnet.com/products/sonos-bu150-digital-music-system/>.

Faller, Christof, "Coding of Spatial Audio Compatible with Different Playback Formats," Audio Engineering Society Convention Paper (Presented at the 117th Convention), Oct. 28-31, 2004, 12 pages.

File History of Re-Examination Application No. 90/013,423.

**US 10,469,966 B2**

Page 19

---

(56)

**References Cited**

**OTHER PUBLICATIONS**

Final Office Action dated Jun. 5, 2014, issued in connection with U.S. Appl. No. 13/907,666, filed May 31, 2013, 12 pages.

Final Office Action dated Jul. 13, 2009, issued in connection with U.S. Appl. No. 10/816,217, filed Apr. 1, 2004, 16 pages.

Final Office Action dated Sep. 13, 2012, issued in connection with U.S. Appl. No. 13/297,000, filed Nov. 15, 2011, 17 pages.

Final Office Action dated Nov. 18, 2015, issued in connection with U.S. Appl. No. 13/533,105, filed Jun. 26, 2012, 56 pages.

Final Office Action dated Oct. 21, 2011, issued in connection with U.S. Appl. No. 10/816,217, filed Apr. 1, 2004, 19 pages.

Final Office Action dated Jul. 23, 2014, issued in connection with U.S. Appl. No. 13/896,037, filed May 16, 2013, 12 pages.

AuviTran AVB32-ES User's Manual, 2005, 25 pages.

AuviTran AVKIT-ES for AD8HR User's Manual, 2005, 15 pages.

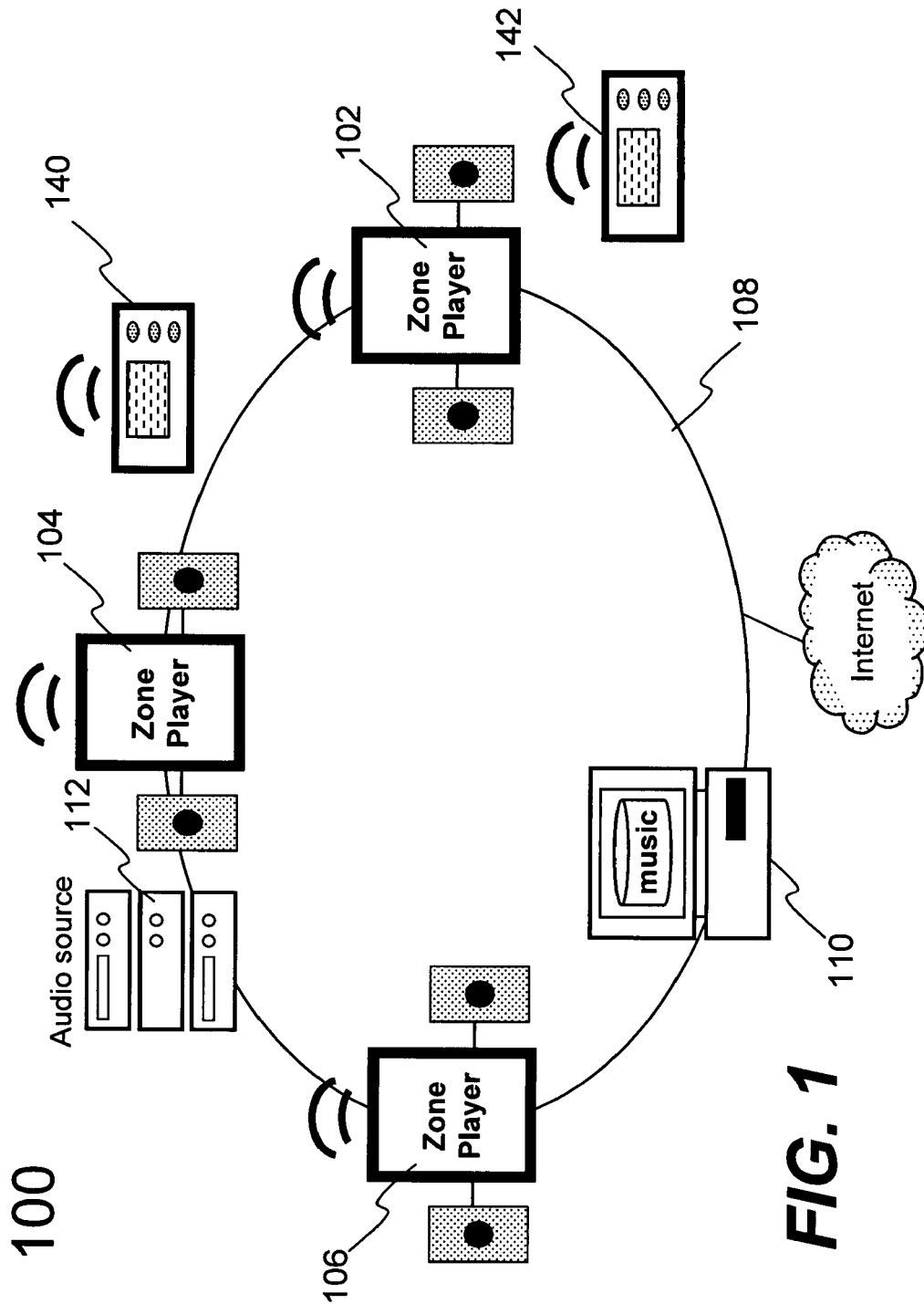
CobraNet Manager, Direct control over your audio network. [www.peakaudio.com/CobraNet/FAQ.html](http://www.peakaudio.com/CobraNet/FAQ.html), 2005 [retrieved online Jul. 12, 2019 at [web.archive.org/web/20050403214230/http://www.peakaudio.com/CobraNet/FAQ](http://web.archive.org/web/20050403214230/http://www.peakaudio.com/CobraNet/FAQ)] 13 pages.

Non-Final Office Action dated Jul. 17, 2019, issued in connection with U.S. Appl. No. 15/130,919, filed Apr. 15, 2016, 15 pages.

Non-Final Office Action dated Aug. 28, 2019, issued in connection with U.S. Appl. No. 16/422,160, filed May 24, 2019, 14 pages.

Non-Final Office Action dated Jul. 5, 2019, issued in connection with U.S. Appl. No. 16/383,561, filed Apr. 12, 2019, 12 pages.

\* cited by examiner



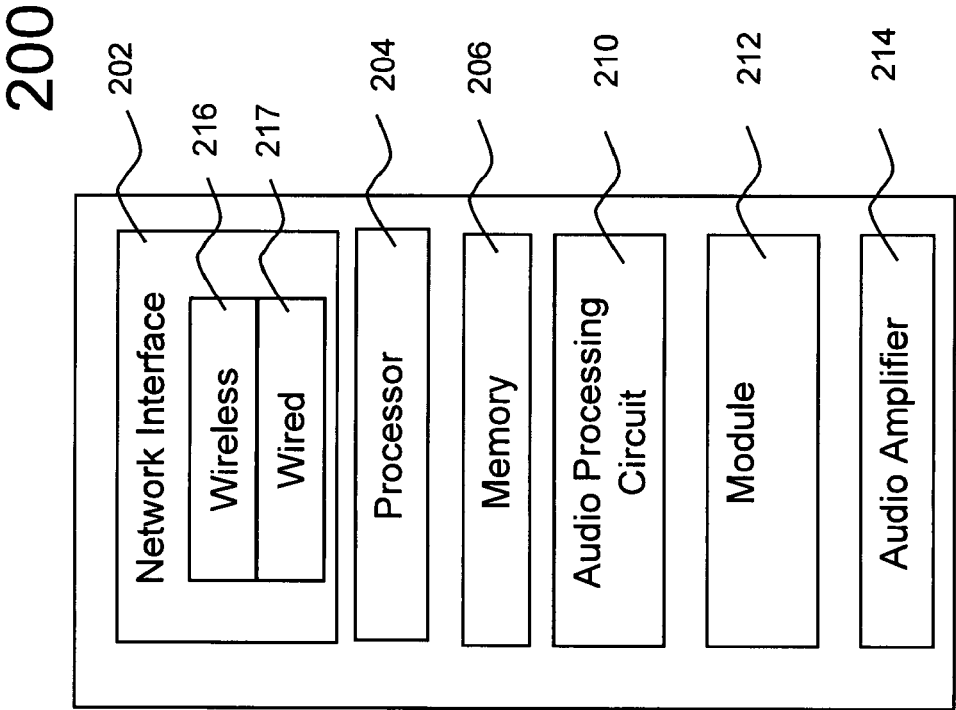
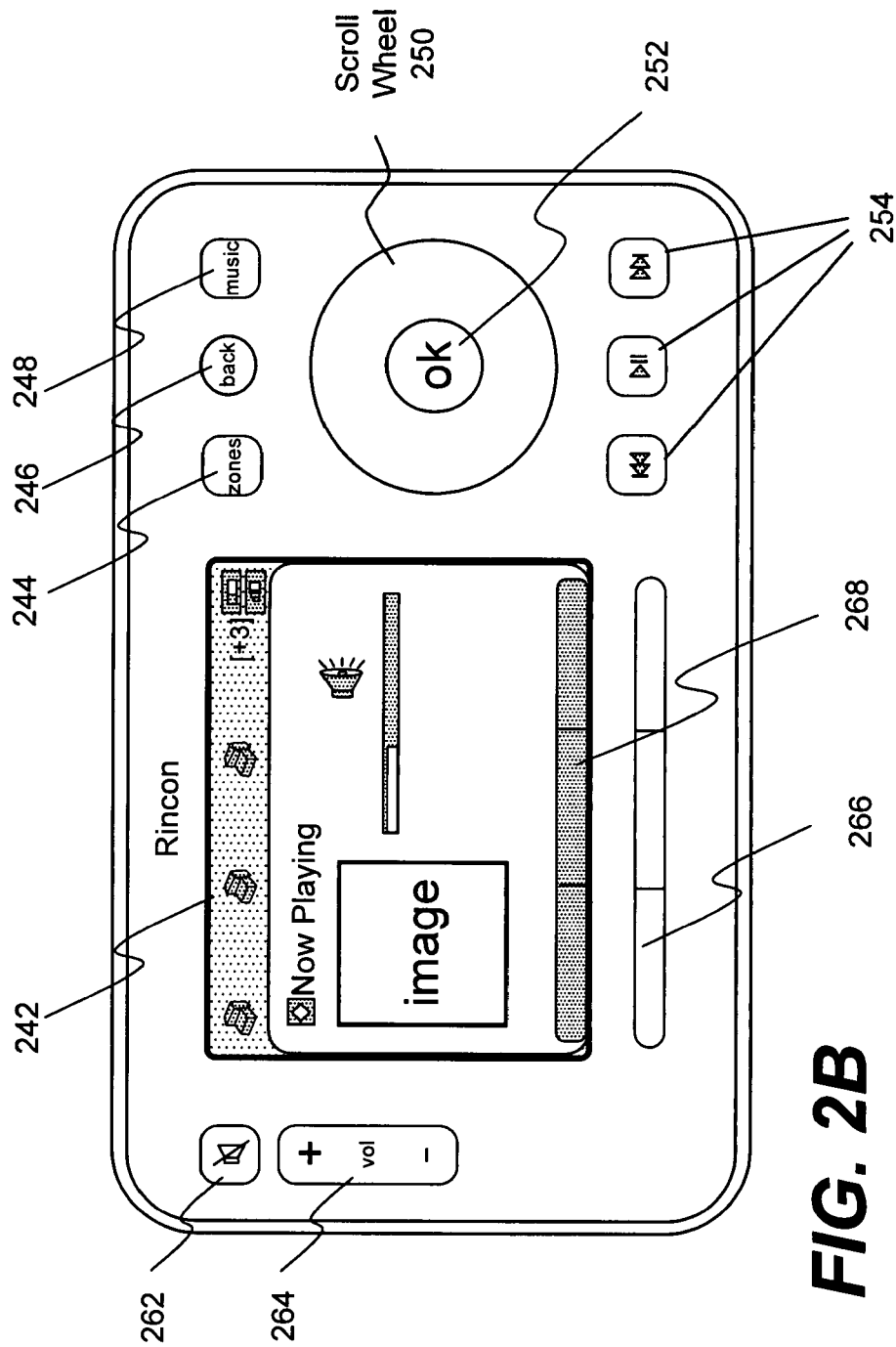


FIG. 2A

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**FIG. 2B**



270

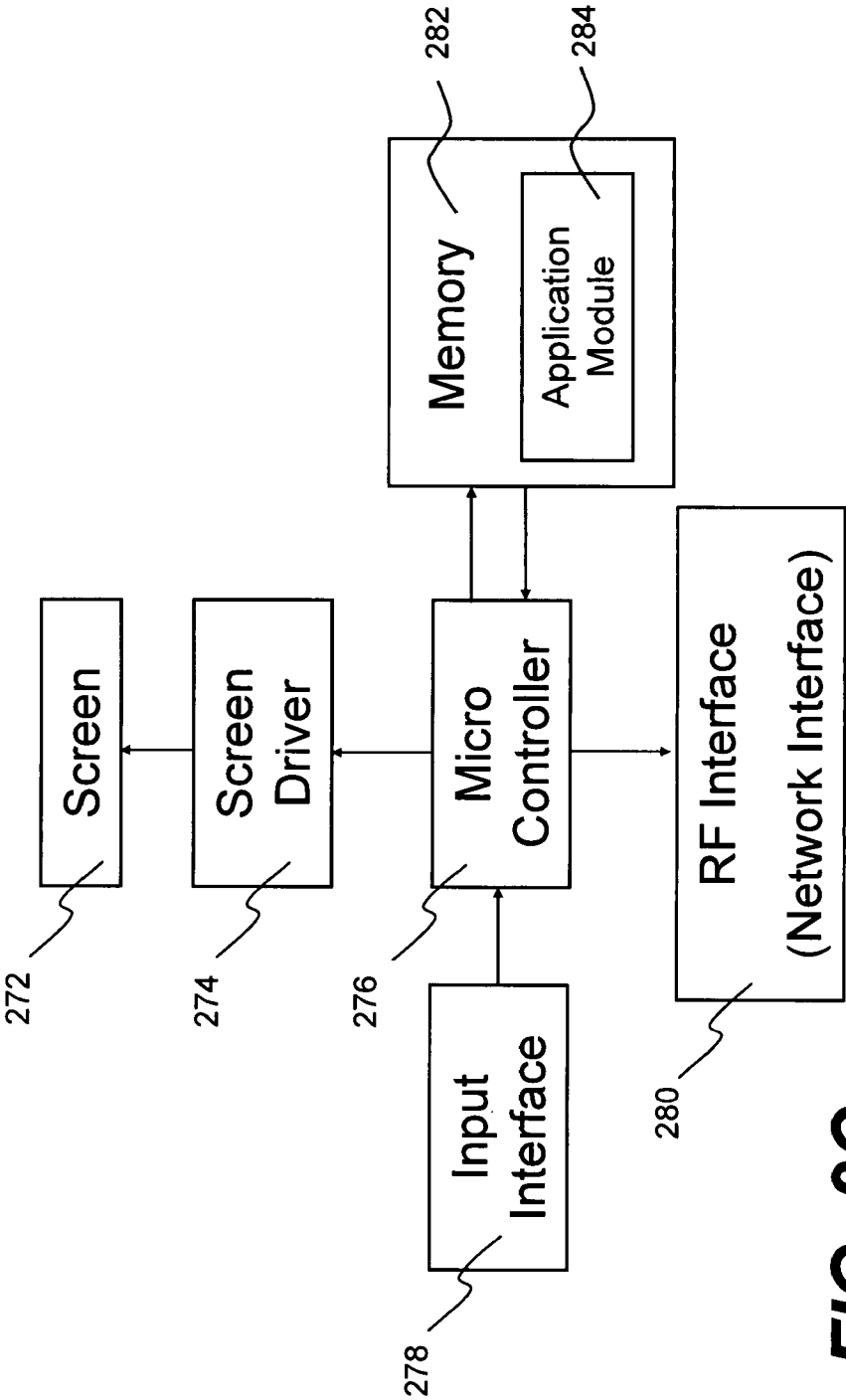


FIG. 2C

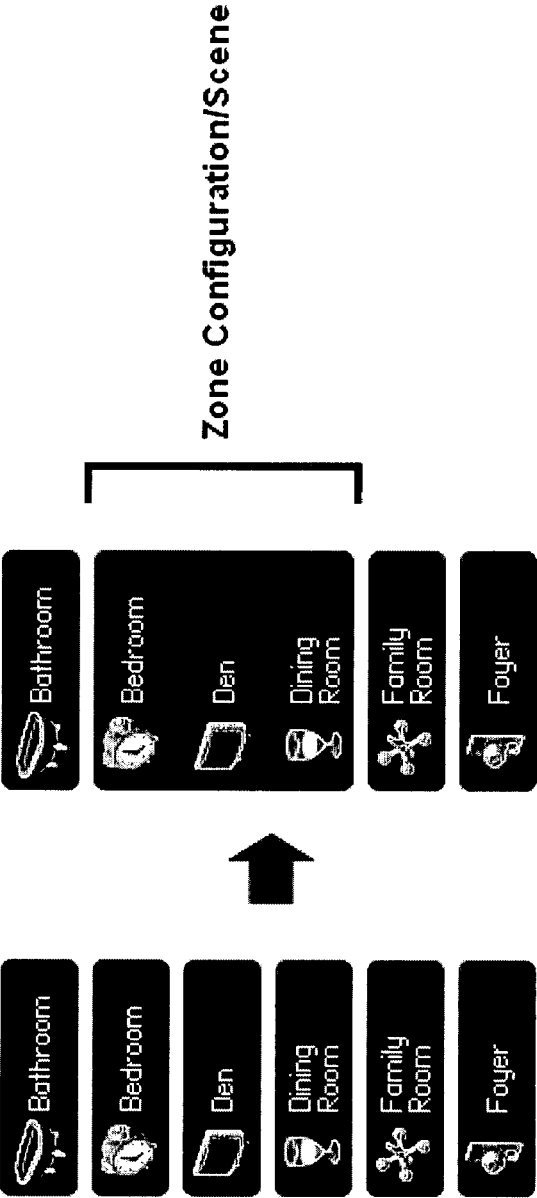


FIG. 3A

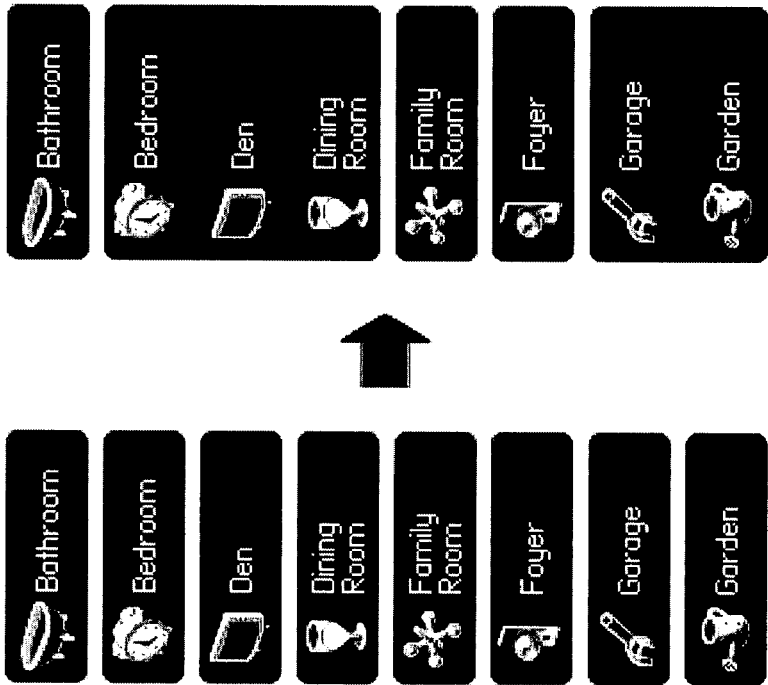


FIG. 3B

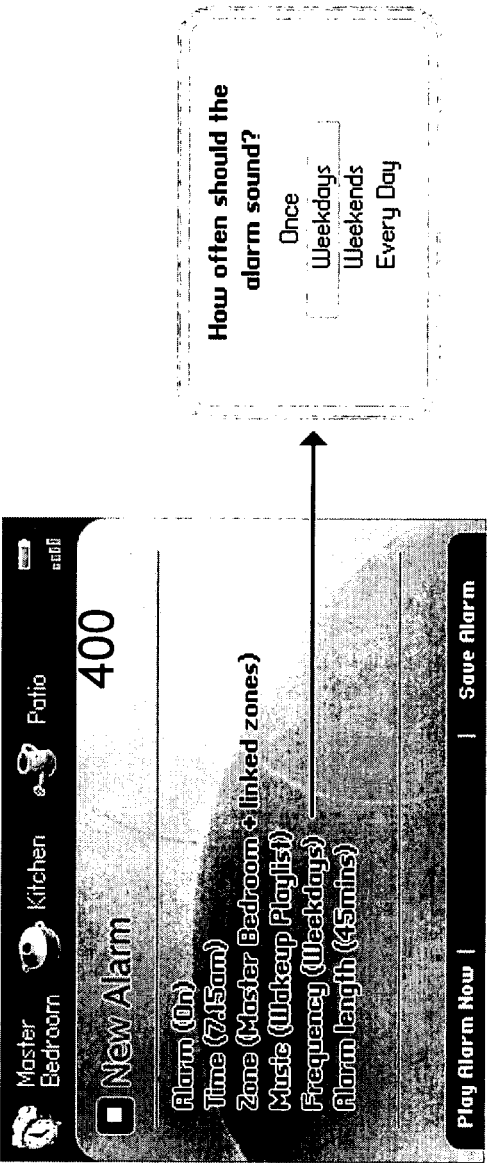
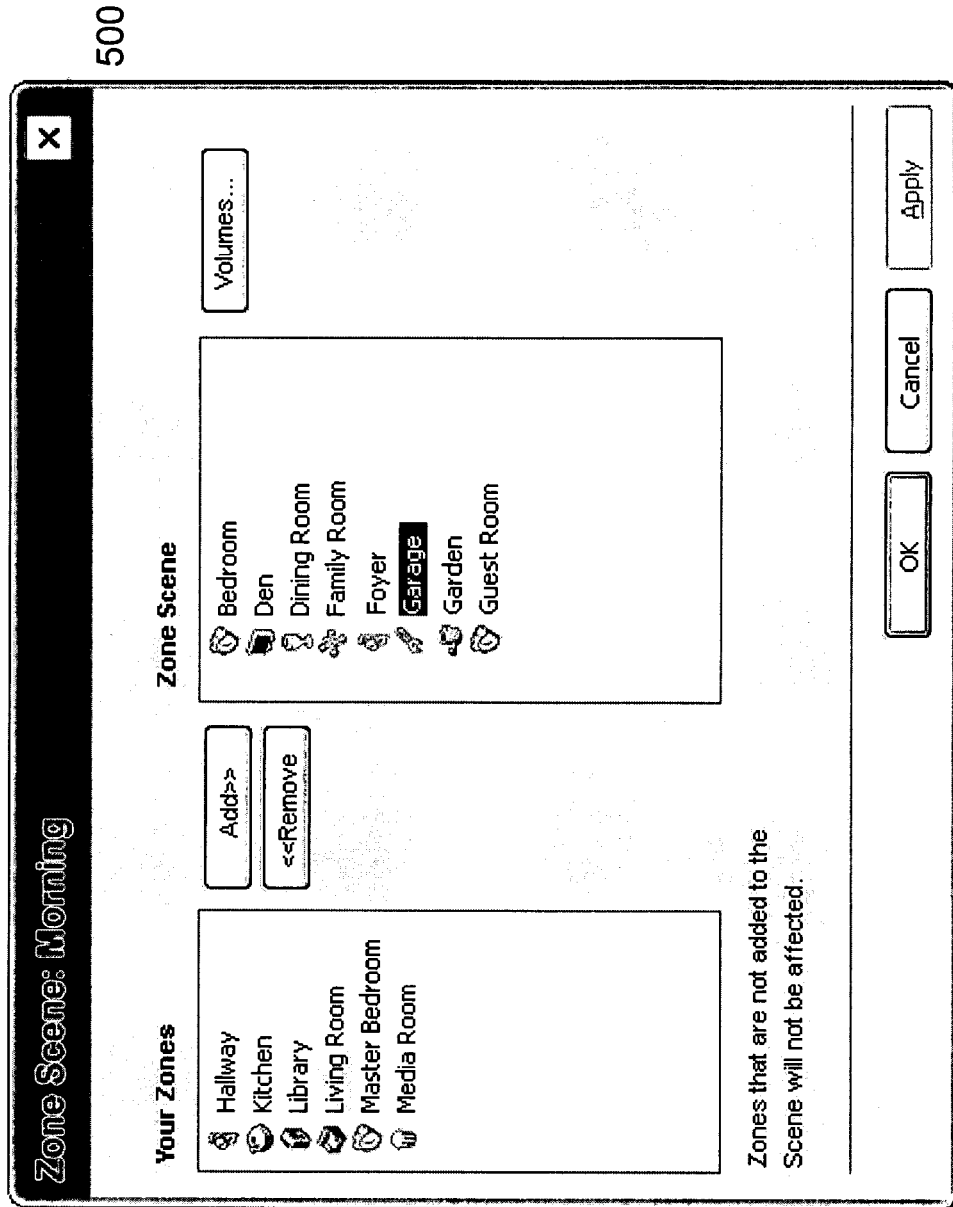


FIG. 4



**FIG. 5A**

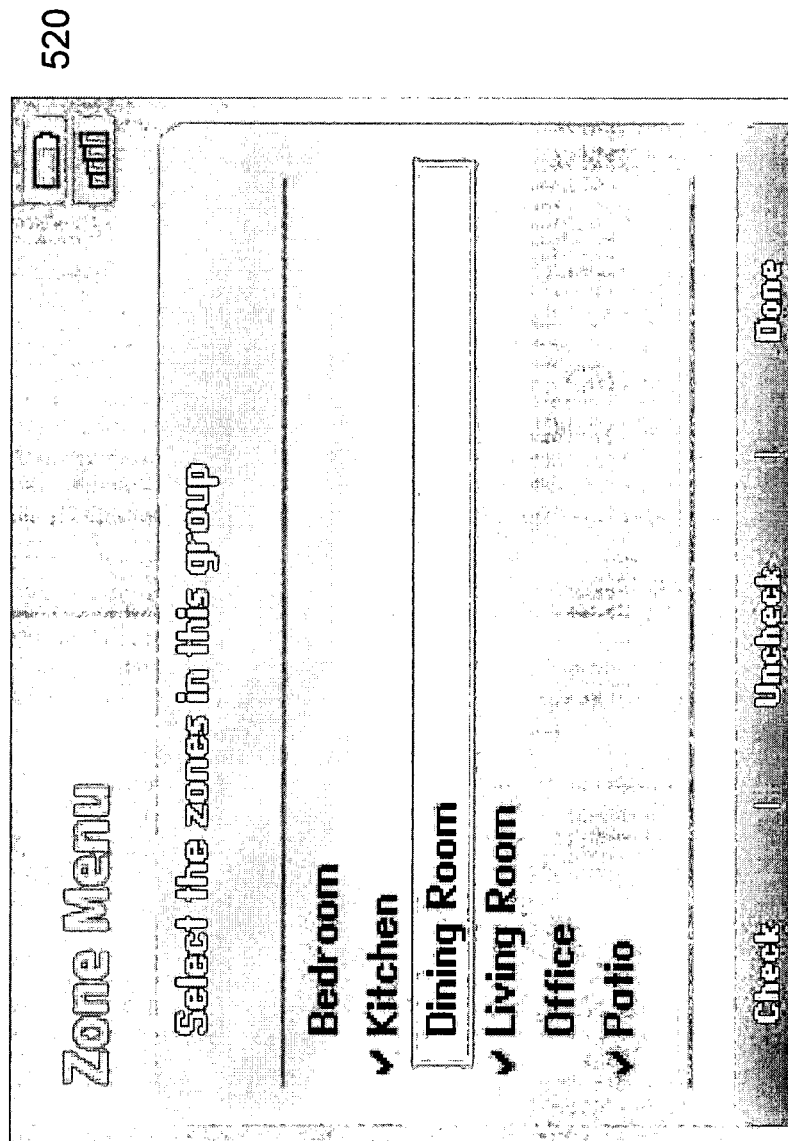


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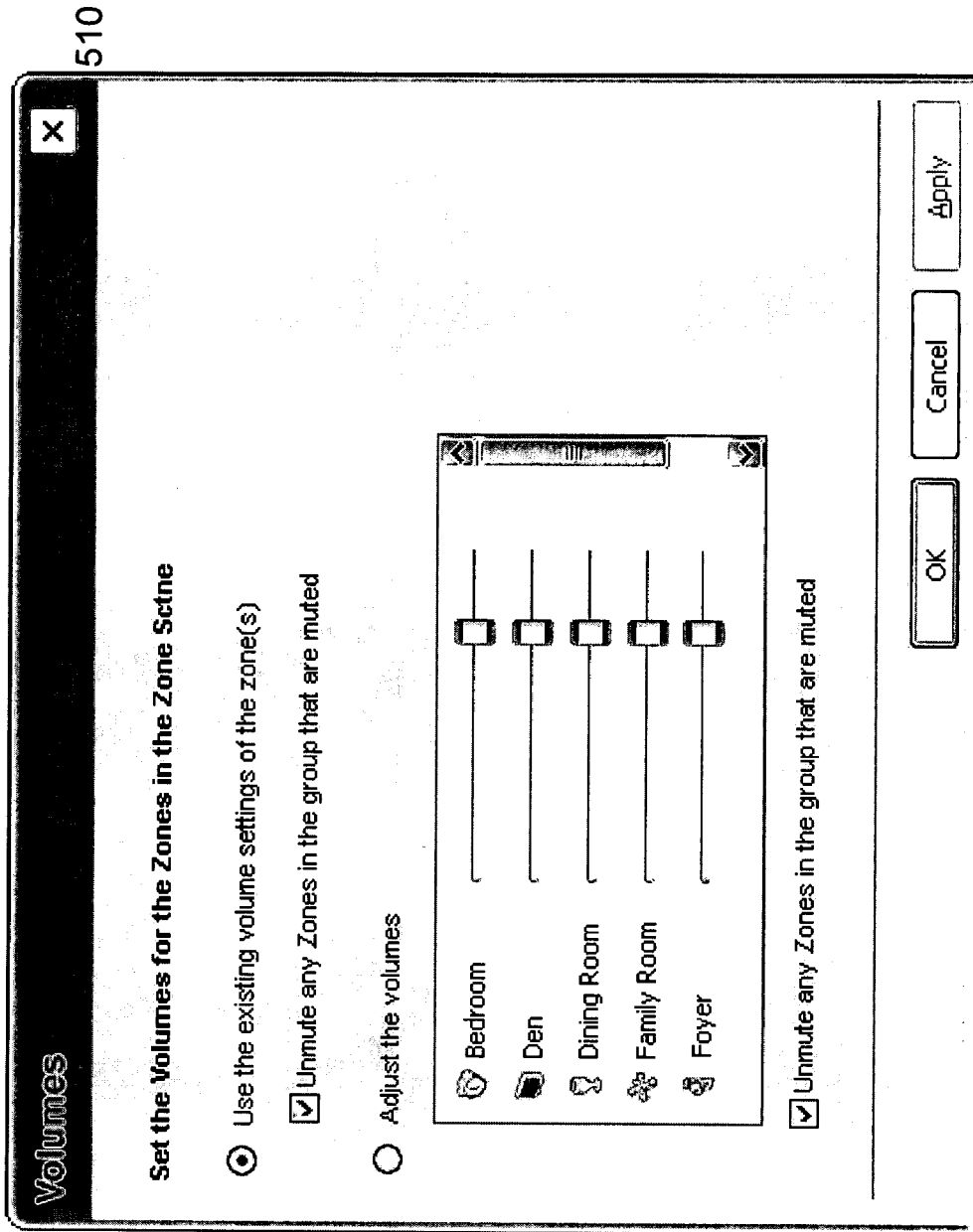
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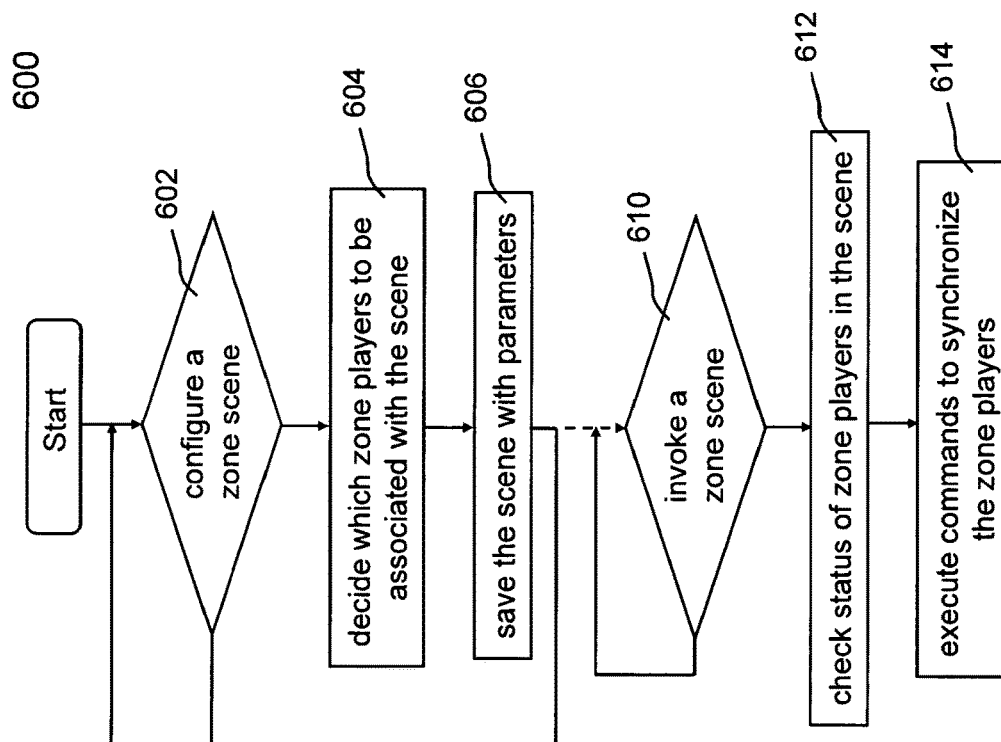
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**FIG. 5B**



**FIG. 5C**

**FIG. 6**

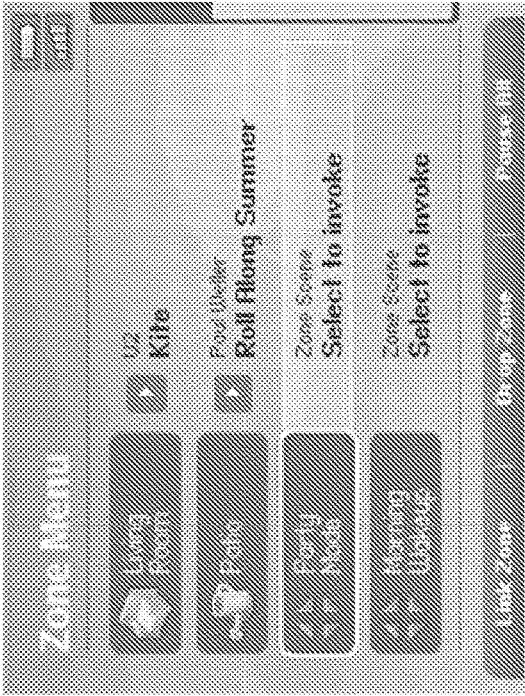
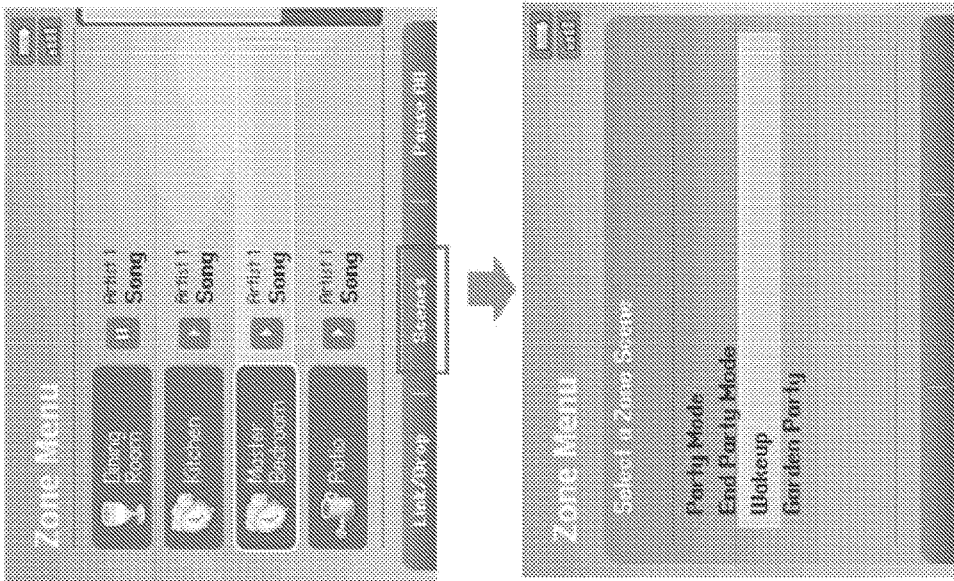


FIG. 7



**FIG. 8**



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**ZONE SCENE MANAGEMENT****CROSS REFERENCE TO RELATED APPLICATIONS**

This application is a continuation of and claims priority to U.S. patent application Ser. No. 15/130,919, filed on Apr. 15, 2016, entitled "ZONE SCENE ACTIVATION," which is a continuation of U.S. patent application Ser. No. 14/465,457, filed on Aug. 21, 2014, entitled "METHOD AND APPARATUS FOR UPDATING ZONE CONFIGURATIONS IN A MULTI-ZONE SYSTEM," which is a continuation of U.S. patent application Ser. No. 13/896,829, filed on May 17, 2013, entitled "METHOD AND APPARATUS FOR UPDATING ZONE CONFIGURATIONS IN A MULTI-ZONE SYSTEM," which is a continuation of U.S. patent application Ser. No. 11/853,790, filed Sep. 11, 2007, entitled "CONTROLLING AND MANIPULATING GROUPINGS IN A MULTI-ZONE MEDIA SYSTEM," which claims priority to U.S. Provisional Application No. 60/825,407 filed on Sep. 12, 2006, entitled "CONTROLLING AND MANIPULATING GROUPINGS IN A MULTI-ZONE MEDIA SYSTEM," each of which is hereby incorporated by reference in its entirety for all purposes.

**BACKGROUND OF THE INVENTION****Field of the Invention**

The invention is generally related to the area of consumer electronics and human-computer interaction. In particular, the invention is related to method and apparatus for controlling or manipulating a plurality of multimedia players in a multi-zone system.

An enduring passion for quality audio reproduction or system is continuing to drive demands from users. One of the demands includes an audio system in a house in which, for example, one could grill to classic rock on a patio while another one may cook up his/her own music selections in a kitchen. This is all at the same time while a teenager catches a ballgame in a family room, and another one blasts pop in a bedroom. And the best part of such audio system is that each family member does not need his or her own stereo system—one system gives everyone access to all the music sources.

Currently, one of the systems that can meet part of such demand is a conventional multi-zone audio system that usually includes a number of audio players. Each of the audio players has its own amplifier(s) and a set of speakers and typically installed in one place (e.g., a room). In order to play an audio source at one location, the audio source must be provided locally or from a centralized location. When the audio source is provided locally, the multi-zone audio system functions as a collection of many stereo systems, making source sharing difficult. When the audio source is provided centrally, the centralized location may include a juke box, many compact discs, an AM or FM radio, tapes, or others. To send an audio source to an audio player demanding such source, a cross-bar type of device is used to prevent the audio source from going to other audio players that may be playing other audio sources.

In order to achieve playing different audio sources in different audio players, the traditional multi-zone audio system is generally either hard-wired or controlled by a pre-configured and pre-programmed controller. While the pre-programmed configuration may be satisfactory in one situation, it may not be suitable for another situation. For

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example, a person would like to listen to broadcast news from his/her favorite radio station in a bedroom, a bathroom and a den while preparing to go to work in the morning. The same person may wish to listen in the den and the living room to music from a compact disc in the evening. In order to satisfy such requirements, two groups of audio players must be established. In the morning, the audio players in the bedroom, the bathroom and the den need to be grouped for the broadcast news. In the evening, the audio players in the den and the living room are grouped for the music. Over the weekend, the audio players in the den, the living room, and a kitchen are grouped for party music. Because the morning group, the evening group and the weekend group contain the den, it can be difficult for the traditional system to accommodate the requirement of dynamically managing the ad hoc creation and deletion of groups.

There is a need for dynamic control of the audio players as a group. With a minimum manipulation, the audio players may be readily grouped. In a traditional multi-zone audio system, the audio players have to be adjusted one at a time, resulting in an inconvenient and non-homogenous audio environment. Further, there is a need to individually or systematically adjust the audio volume of the audio players.

**SUMMARY OF THE INVENTION**

This section is for the purpose of summarizing some aspects of the present invention and to briefly introduce some preferred embodiments. Simplifications or omissions in this section as well as in the abstract or the title of this description may be made to avoid obscuring the purpose of this section, the abstract and the title. Such simplifications or omissions are not intended to limit the scope of the present invention.

In general, the present invention pertains to controlling a plurality of multimedia players, or simply players, in groups. According to one aspect of the present invention, a mechanism is provided to allow a user to group some of the players according to a theme or scene, where each of the players is located in a zone. When the scene is activated, the players in the scene react in a synchronized manner. For example, the players in the scene are all caused to play an audio source or music in a playlist, wherein the audio source may be located anywhere on a network.

According to another aspect of the present invention, the scene may be activated at any time or a specific time. A user may activate the scene at any time so that only some selected zones in an entertainment system facilitate a playback of an audio source. When the scene is activated at a specific time, the scene may be used as an alarm or buzzer.

According to still another aspect of the present invention, a controlling device (also referred to herein as controller) is provided to facilitate a user to select any of the players in the system to form respective groups each of which is set up per a scene. Although various scenes may be saved in any of the members in a group, commands are preferably sent from the controller to the rest of the members when one of the scenes is executed. Depending on implementation, the commands include parameters pertaining to identifiers of the players, volumes settings, audio source and etc.

According to yet another aspect of the present invention, a configurable module is implemented in the controlling device that provides interactive graphic user interface for forming, managing and controlling groups in the system, de-grouping a group or adjusting audio volume of individual players or a group of players.

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The present invention may be implemented in many forms including software, hardware or a combination of both. According to one embodiment, the present invention is directed to a method for groupings in a multi-zone media system, the method comprises providing a mechanism to allow a user to determine which players in the system to be associated with a theme representing a group; and configuring the theme with parameters pertaining to the players, wherein the theme is activated at anytime or a specific time so that the players react in a synchronized manner. The players in a scene are synchronized to play a multimedia file when the scene is activated.

According to another embodiment, the present invention is directed to an entertainment system for grouping players, the system comprises: a plurality of players, each located in one zone; and a controller providing a mechanism to allow a user to select which of the players to be associated with a theme representing a group; and configure the theme with parameters pertaining to the selected players, wherein the theme is activated at anytime or a specific time so that the selected players react in a synchronized manner. As a result, the selected players are synchronized to play a multimedia that is in a digital format and retrieved from a source over a network.

One of the objects, features, and advantages of the present invention is to remotely control a plurality of multimedia players in a multi-zone system, playing and controlling the audio source synchronously if the players are grouped together, or playing and controlling the audio source individually if the players are disassociated with each other.

Other objects, features, and advantages of the present invention will become apparent upon examining the following detailed description of an embodiment thereof, taken in conjunction with the attached drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings where:

FIG. 1 shows an exemplary configuration in which the present invention may be practiced;

FIG. 2A shows an exemplary functional block diagram of a player in accordance with the present invention;

FIG. 2B shows an example of a controller that may be used to remotely control one of more players of FIG. 2A;

FIG. 2C shows an exemplary internal functional block diagram of a controller in accordance with one embodiment of the present invention;

FIG. 3A provides an illustration of one zone scene, where the left column shows the starting zone grouping—all zones are separate, the column on the right shows the effects of grouping the zones to make a group of 3 zones named after “Morning”;

FIG. 3B shows that a user defines multiple groups to be gathered at the same time;

FIG. 4 shows an exemplary user interface that may be displayed on a controller or a computer of FIG. 1;

FIG. 5A shows a user interface to allow a user to form a scene;

FIG. 5B shows another user interface 520 to allow a user to form a scene;

FIG. 5C shows a user interface to allow a user to adjust a volume level of the zone players in a zone scene individually or collectively;

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FIG. 6 shows a flowchart or process of providing a player theme or a zone scene for a plurality of players, where one or more of the players are placed in a zone; and

FIG. 7 shows an example user interface for invoking a zone scene; and

FIG. 8 shows another example user interface for invoking a zone scene.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The detailed description of the invention is presented largely in terms of procedures in terms of procedures, steps, logic blocks, processing, and other symbolic representations that directly or indirectly resemble the operations of data processing devices coupled to networks. These process descriptions and representations are typically used by those skilled in the art to most effectively convey the substance of their work to others skilled in the art. Numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will become obvious to those skilled in the art that the present invention may be practiced without these specific details. In other instances, well known methods, procedures, components, and circuitry have not been described in detail to avoid unnecessarily obscuring aspects of the present invention.

Reference herein to “one embodiment” or “an embodiment” means that a particular feature, structure, or characteristic described in connection with the embodiment can be included in at least one embodiment of the invention. The appearances of the phrase “in one embodiment” in various places in the specification are not necessarily all referring to the same embodiment, nor are separate or alternative embodiments mutually exclusive of other embodiments. Further, the order of blocks in process flowcharts or diagrams representing one or more embodiments of the invention do not inherently indicate any particular order nor imply any limitations in the invention.

Referring now to the drawings, in which like numerals refer to like parts throughout the several views. FIG. 1 shows an exemplary configuration 100 in which the present invention may be practiced. The configuration may represent, but not be limited to, a part of a residential home, a business building or a complex with multiple zones. There are a number of multimedia players of which three examples 102, 104 and 106 are shown as audio devices. Each of the audio devices may be installed or provided in one particular area or zone and hence referred to as a zone player herein.

As used herein, unless explicitly stated otherwise, an audio source or audio sources are in digital format and can be transported or streamed over a data network. To facilitate the understanding of the present invention, it is assumed that the configuration 100 represents a home. Thus, the zone player 102 and 104 may be located in two of the bedrooms respectively while the zone player 106 may be installed in a living room. All of the zone players 102, 104 and 106 are coupled directly or indirectly to a data network 108. In addition, a computing device 110 is shown to be coupled on the network 108. In reality, any other devices such as a home gateway device, a storage device, or an MP3 player may be coupled to the network 108 as well.

The network 108 may be a wired network, a wireless network or a combination of both. In one example, all devices including the zone players 102, 104 and 106 are coupled to the network 108 by wireless means based on an industry standard such as IEEE 802.11. In yet another example, all devices including the zone players 102, 104 and

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**106** are part of a local area network that communicates with a wide area network (e.g., the Internet).

Many devices on the network **108** are configured to download and store audio sources. For example, the computing device **110** can download audio sources from the Internet and store the downloaded sources locally for sharing with other devices on the Internet or the network **108**. The computing device **110** or any of the zone players can also be configured to receive streaming audio. Shown as a stereo system, the device **112** is configured to receive an analog audio source (e.g., from broadcasting) or retrieve a digital audio source (e.g., from a compact disk). The analog audio sources can be converted to digital audio sources. In accordance with the present invention, the audio source may be shared among the devices on the network **108**.

Two or more zone players may be grouped together to form a new zone group. Any combinations of zone players and an existing zone group may be grouped together. In one instance, a new zone group is formed by adding one zone player to another zone player or an existing zone group.

Referring now to FIG. 2A, there is shown an exemplary functional block diagram of a zone player **200** in accordance with the present invention. The zone player **200** includes a network interface **202**, a processor **204**, a memory **206**, an audio processing circuit **210**, a module **212**, and optionally, an audio amplifier **214** that may be internal or external. The network interface **202** facilitates a data flow between a data network (i.e., the data network **108** of FIG. 1) and the zone player **200** and typically executes a special set of rules (i.e., a protocol) to send data back and forth. One of the common protocols used in the Internet is TCP/IP (Transmission Control Protocol/Internet Protocol). In general, a network interface manages the assembling of an audio source or file into smaller packets that are transmitted over the data network or reassembles received packets into the original source or file. In addition, the network interface **202** handles the address part of each packet so that it gets to the right destination or intercepts packets destined for the zone player **200**.

The network interface **202** may include one or both of a wireless interface **216** and a wired interface **217**. The wireless interface **216**, also referred to as a RF interface, provides network interface functions by a wireless means for the zone player **200** to communicate with other devices in accordance with a communication protocol (such as the wireless standard IEEE 802.11a, 802.11b or 802.11g). The wired interface **217** provides network interface functions by a wired means (e.g., an Ethernet cable). In one embodiment, a zone player includes both of the interfaces **216** and **217**, and other zone players include only a RF or wired interface. Thus these other zone players communicate with other devices on a network or retrieve audio sources via the zone player. The processor **204** is configured to control the operation of other parts in the zone player **200**. The memory **206** may be loaded with one or more software modules that can be executed by the processor **204** to achieve desired tasks. According to one aspect of the present invention, a software module implementing one embodiment of the present invention is executed, the processor **204** operates in accordance with the software module in reference to a saved zone group configuration characterizing a zone group created by a user, the zone player **200** is caused to retrieve an audio source from another zone player or a device on the network.

According to one embodiment of the present invention, the memory **206** is used to save one or more saved zone configuration files that may be retrieved for modification at

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any time. Typically, a saved zone group configuration file is transmitted to a controller (e.g., the controlling device **140** or **142** of FIG. 1, a computer, a portable device, or a TV) when a user operates the controlling device. The zone group configuration provides an interactive user interface so that various manipulations or control of the zone players may be performed.

The audio processing circuit **210** resembles most of the circuitry in an audio playback device and includes one or more digital-to-analog converters (DAC), an audio preprocessing part, an audio enhancement part or a digital signal processor and others. In operation, when an audio source is retrieved via the network interface **202**, the audio source is processed in the audio processing circuit **210** to produce analog audio signals. The processed analog audio signals are then provided to the audio amplifier **214** for playback on speakers. In addition, the audio processing circuit **210** may include necessary circuitry to process analog signals as inputs to produce digital signals for sharing with other devices on a network.

Depending on an exact implementation, the module **212** may be implemented as a combination of hardware and software. In one embodiment, the module **212** is used to save a scene. The audio amplifier **214** is typically an analog circuit that powers the provided analog audio signals to drive one or more speakers.

Referring now to FIG. 2B, there is shown an exemplary controller **240**, which may correspond to the controlling device **140** or **142** of FIG. 1. The controller **240** may be used to facilitate the control of multi-media applications, automation and others in a complex. In particular, the controller **240** is configured to facilitate a selection of a plurality of audio sources available on the network, controlling operations of one or more zone players (e.g., the zone player **200**) through a RF interface corresponding to the RF interface **216** of FIG. 2A. According to one embodiment, the wireless means is based on an industry standard (e.g., infrared, radio, wireless standard IEEE 802.11a, 802.11b or 802.11g). When a particular audio source is being played in the zone player **200**, a picture, if there is any, associated with the audio source may be transmitted from the zone player **200** to the controller **240** for display. In one embodiment, the controller **240** is used to synchronize more than one zone players by grouping the zone players in a group. In another embodiment, the controller **240** is used to control the volume of each of the zone players in a zone group individually or together.

The user interface for the controller **240** includes a screen **242** (e.g., a LCD screen) and a set of functional buttons as follows: a "zones" button **244**, a "back" button **246**, a "music" button **248**, a scroll wheel **250**, "ok" button **252**, a set of transport control buttons **254**, a mute button **262**, a volume up/down button **264**, a set of soft buttons **266** corresponding to the labels **268** displayed on the screen **242**.

The screen **242** displays various screen menus in response to a user's selection. In one embodiment, the "zones" button **244** activates a zone management screen or "Zone Menu", which is described in more details below. The "back" button **246** may lead to different actions depending on the current screen. In one embodiment, the "back" button triggers the current screen display to go back to a previous one. In another embodiment, the "back" button negates the user's erroneous selection. The "music" button **248** activates a music menu, which allows the selection of an audio source (e.g., a song) to be added to a zone player's music queue for playback.



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The scroll wheel **250** is used for selecting an item within a list, whenever a list is presented on the screen **242**. When the items in the list are too many to be accommodated in one screen display, a scroll indicator such as a scroll bar or a scroll arrow is displayed beside the list. When the scroll indicator is displayed, a user may rotate the scroll wheel **250** to either choose a displayed item or display a hidden item in the list. The “ok” button **252** is used to confirm the user selection on the screen **242**.

There are three transport buttons **254**, which are used to control the effect of the currently playing song. For example, the functions of the transport buttons may include play/pause and forward/rewind a song, move forward to a next song track, or move backward to a previous track. According to one embodiment, pressing one of the volume control buttons such as the mute button **262** or the volume up/down button **264** activates a volume panel. In addition, there are three soft buttons **266** that can be activated in accordance with the labels **268** on the screen **242**. It can be understood that, in a multi-zone system, there may be multiple audio sources being played respectively in more than one zone players. The music transport functions described herein shall apply selectively to one of the sources when a corresponding one of the zone players or zone groups is selected.

FIG. 2C illustrates an internal functional block diagram of an exemplary controller **270**, which may correspond to the controller **240** of FIG. 2B. The screen **272** on the controller **270** may be a LCD screen. The screen **272** communicates with and is commanded by a screen driver **274** that is controlled by a microcontroller (e.g., a processor) **276**. The memory **282** may be loaded with one or more application modules **284** that can be executed by the microcontroller **276** with or without a user input via the user interface **278** to achieve desired tasks. In one embodiment, an application module is configured to facilitate grouping a number of selected zone players into a zone group and synchronizing the zone players for one audio source. In another embodiment, an application module is configured to control together the audio volumes of the zone players in a zone group. In operation, when the microcontroller **276** executes one of the application modules **284**, the screen driver **274** generates control signals to drive the screen **272** to display an application specific user interface accordingly, more of which will be described below.

The controller **270** includes a network interface **280** referred to as a RF interface **280** that facilitates wireless communication with a zone player via a corresponding RF interface thereof. In one embodiment, the commands such as volume control and audio playback synchronization are sent via the RF interfaces. In another embodiment, a saved zone group configuration is transmitted between a zone player and a controller via the RF interfaces. The controller **270** may control one or more zone players, such as **102**, **104** and **106** of FIG. 1. Nevertheless, there may be more than one controllers, each preferably in a zone (e.g., a room) and configured to control any one and all of the zone players.

In one embodiment, a user creates a zone group including at least two zone players from the controller **240** that sends signals or data to one of the zone players. As all the zone players are coupled on a network, the received signals in one zone player can cause other zone players in the group to be synchronized so that all the zone players in the group playback an identical audio source or a list of identical audio sources in a timely synchronized manner. Similarly, when a user increases the audio volume of the group from the controller, the signals or data of increasing the audio volume

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for the group are sent to one of the zone players and causes other zone players in the group to be increased together in volume and in scale.

According to one implementation, an application module is loaded in memory **282** for zone group management. When a predetermined key (e.g. the “zones” button **244**) is activated on the controller **240**, the application module is executed in the microcontroller **276**. The input interface **278** coupled to and controlled by the microcontroller **276** receives inputs from a user. A “Zone Menu” is then displayed on the screen **272**. The user may start grouping zone players into a zone group by activating a “Link Zones” or “Add Zone” soft button, or de-grouping a zone group by activating an “Unlink Zones” or “Drop Zone” button. The detail of the zone group manipulation will be further discussed below.

As described above, the input interface **278** includes a number of function buttons as well as a screen graphical user interface. It should be pointed out that the controller **240** in FIG. 2B is not the only controlling device that may practice the present invention. Other devices that provide the equivalent control functions (e.g., a computing device, a hand-held device) may also be configured to practice the present invention. In the above description, unless otherwise specifically described, it is clear that keys or buttons are generally referred to as either the physical buttons or soft buttons, enabling a user to enter a command or data.

One mechanism for ‘joining’ zone players together for music playback is to link a number of zone players together to form a group. To link a number of zone players together, a user may manually link each zone player or room one after the other. For example, there is a multi-zone system that includes the following zones.

- Bathroom
- Bedroom
- Den
- Dining Room
- Family Room
- Foyer

If the user wishes to link **5** of the **6** zone players using the current mechanism, he/she must start with a single zone and then manually link each zone to that zone. This mechanism may be sometimes quite time consuming. According to one embodiment, a set of zones can be dynamically linked together using one command. Using what is referred to herein as a theme or a zone scene, zones can be configured in a particular scene (e.g., morning, afternoon, or garden), where a predefined zone grouping and setting of attributes for the grouping are automatically effectuated.

For instance, a “Morning” zone scene/configuration command would link the Bedroom, Den and Dining Room together in one action. Without this single command, the user would need to manually and individually link each zone. FIG. 3A provides an illustration of one zone scene, where the left column shows the starting zone grouping—all zones are separate, the column on the right shows the effects of grouping the zones to make a group of 3 zones named after “Morning”.

Expanding this idea further, a Zone Scene can be set to create multiple sets of linked zones. For example, a scene creates **3** separate groups of zones, the downstairs zones would be linked together, the upstairs zones would be linked together in their own group, and the outside zones (in this case the patio) would move into a group of its own.

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In one embodiment as shown in FIG. 3B, a user defines multiple groups to be gathered at the same time. For example: an “Evening Scene” is desired to link the following zones:

Group 1  
Bedroom  
Den  
Dining Room  
Group 2  
Garage  
Garden

where Bathroom, Family Room and Foyer should be separated from any group if they were part of a group before the Zone Scene was invoked.

One important of the features, benefits and objects in the present invention is that zones do not need to be separated before a zone scene is invoked. In one embodiment, a command is provided and links all zones in one step, if invoked. The command is in a form of a zone scene. After linking the appropriate zones, a zone scene command could apply the following attributes:

Set volumes levels in each zones (each zone can have a different volume)

Mute/Unmute zones.

Select and play specific music in the zones.

Set the play mode of the music (Shuffle, Repeat, Shuffle-repeat)

Set the music playback equalization of each zone (e.g., bass treble).

A further extension of this embodiment is to trigger a zone scene command as an alarm clock function. For instance the zone scene is set to apply at 8:00 am. It could link appropriate zones automatically, set specific music to play and then stop the music after a defined duration. Although a single zone may be assigned to an alarm, a scene set as an alarm clock provides a synchronized alarm, allowing any zones linked in the scene to play a predefined audio (e.g., a favorable song, a predefined playlist) at a specific time or for a specific duration. If, for any reason, the scheduled music failed to be played (e.g., an empty playlist, no connection to a share, failed UPnP, no Internet connection for an Internet Radio station), a backup buzzer will sound. This buzzer will be a sound file that is stored in a zone player.

FIG. 4 shows an exemplary user interface 400 that may be displayed on a controller 142 or a computer 110 of FIG. 1. The interface 400 shows a list of items that may be set up by a user to cause a scene to function at a specific time. In the embodiment shown in FIG. 4, the list of items includes “Alarm”, “Time”, “Zone”, “Music”, “Frequency” and “Alarm length”. “Alarm” can be set on or off. When “Alarm” is set on, “Time” is a specific time to set off the alarm. “Zone” shows which zone players are being set to play a specified audio at the specific time. “Music” shows what to be played when the specific time arrives. “Frequency” allows the user to define a frequency of the alarm. “Alarm length” defines how long the audio is to be played. It should be noted that the user interface 400 is provided herein to show some of the functions associated with setting up an alarm. Depending on an exact implementation, other functions, such as time zone, daylight savings, time synchronization, and time/date format for display may also be provided without departing from the present invention.

According to one embodiment, each zone player in a scene may be set up for different alarms. For example, a “Morning” scene includes three zone players, each in a bedroom, a den, and a dining room. After selecting the

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scene, the user may set up an alarm for the scene as whole. As a result, each of the zone players will be activated at a specific time.

FIG. 5A shows a user interface 500 to allow a user to form a scene. The panel on the left shows the available zones in a household. The panel on the right shows the zones that have been selected and be grouped as part of this scene. Depending on an exact implementation of a user interface, Add/Remove buttons may be provided to move zones between the panels, or zones may be dragged along between panels.

FIG. 5B shows another user interface 520 to allow a user to form a scene. The user interface 520 that may be displayed on a controller or a computing device, lists available zones in a system. The list of zones in the user interface 520 includes ALL the zones in the system, including the zones that are already grouped. A checkbox is provide next to each of the zones so that a user may check in the zones to be associated with the scene.

FIG. 5C shows a user interface 510 to allow a user to adjust a volume level of the zone players in a zone scene individually or collectively. As shown in the user interface 510, the ‘Volumes . . .’ button (shown as sliders, other forms are possible) allows the user to affect the volumes of the associated zone players when a zone scene is invoked. In one embodiment, the zone players can be set to retain whatever volume that they currently have when the scene is invoked. Additionally the user can decide if the volumes should be unmuted or muted when the scene is invoked.

FIG. 6 shows a flowchart or process 600 of providing a player theme or a zone scene for a plurality of players, where one or more of the players are placed in a zone. The process 600 is presented in accordance with one embodiment of the present invention and may be implemented in a module to be located in the memory 282 of FIG. 2C.

The process 600 is initiated only when a user decides to proceed with a zone scene at 602. The process 600 then moves to 604 where it allows a user to decide which zone players to be associated with the scene. For example, there are ten players in a household, and the scene is named after “Morning”. The user may be given an interface to select four of the ten players to be associated with the scene. At 606, the scene is saved. The scene may be saved in any one of the members in the scene. In the example of FIG. 1, the scene is saved in one of the zone players and displayed on the controller 142. In operation, a set of data pertaining to the scene includes a plurality of parameters. In one embodiment, the parameters include, but may not be limited to, identifiers (e.g., IP address) of the associated players and a playlist. The parameters may also include volume/tone settings for the associated players in the scene. The user may go back to 602 to configure another scene if desired.

Given a saved scene, a user may activate the scene at any time or set up a timer to activate the scene at 610. The process 600 can continue when a saved scene is activated at 610. At 612, upon the activation of a saved scene, the process 600 checks the status of the players associated with the scene. The status of the players means that each of the players shall be in condition to react in a synchronized manner. In one embodiment, the interconnections of the players are checked to make sure that the players communicate among themselves and/or with a controller if there is such a controller in the scene.

It is assumed that all players associated with the scene are in good condition. At 614, commands are executed with the parameters (e.g., pertaining to a playlist and volumes). In one embodiment, data including the parameters is trans-



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ported from a member (e.g., a controller) to other members in the scene so that the players are caused to synchronize an operation configured in the scene. The operation may cause all players to play back a song in identical or different volumes or to play back a pre-stored file.

One of the features, benefits and advantages in the present invention is to allow sets of related devices (controllers and operating components) to exist as a group without interfering with other components that are potentially visible on the same wired or wireless network. Each of the sets is configured to a theme or a scene.

FIG. 7 shows an example user interface for invoking a zone scene. The user interface of FIG. 7 shows a Zone Menu that includes selectable indications of zone scenes.

FIG. 8 shows another example user interface for invoking a zone scene. FIG. 8 shows a Zone Menu that includes a softkey indicating a Scenes menu. Pressing the Scenes softkey will show the Scenes menu where all the available zone scenes are shown as selectable indications.

The present invention has been described in sufficient detail with a certain degree of particularity. It is understood to those skilled in the art that the present disclosure of embodiments has been made by way of examples only and that numerous changes in the arrangement and combination of parts may be resorted without departing from the spirit and scope of the invention as claimed. While the embodiments discussed herein may appear to include some limitations as to the presentation of the information units, in terms of the format and arrangement, the invention has applicability well beyond such embodiment, which can be appreciated by those skilled in the art. Accordingly, the scope of the present invention is defined by the appended claims rather than the foregoing description of embodiments.

I claim:

1. A computing device comprising: one or more processors;

a non-transitory computer-readable medium; and program instructions stored on the non-transitory computer-readable medium that, when executed by the one or more processors, cause the computing device to perform functions comprising:

while serving as a controller for a networked media playback system comprising a first zone player and at least two other zone players, wherein the first zone player is operating in a standalone mode in which the first zone player is configured to play back media individually:

receiving a first request to create a first zone scene comprising a first predefined grouping of zone players including at least the first zone player and a second zone player that are to be configured for synchronous playback of media when the first zone scene is invoked;

based on the first request, i) causing creation of the first zone scene, ii) causing an indication of the first zone scene to be transmitted to the first zone player, and iii) causing storage of the first zone scene;

receiving a second request to create a second zone scene comprising a second predefined grouping of zone players including at least the first zone player and a third zone player that are to be configured for synchronous playback of media when the second zone scene is invoked, wherein the third zone player is different than the second zone player;

based on the second request, i) causing creation of the second zone scene, ii) causing an indication of the second zone scene to be transmitted to the first zone player, and iii) causing storage of the second zone

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scene; displaying a representation of the first zone scene and a representation of the second zone scene; and while displaying the representation of the first zone scene and the representation of the second zone scene, receiving a third request to invoke the first zone scene; and

based on the third request, causing the first zone player to transition from operating in the standalone mode to operating in accordance with the first predefined grouping of zone players such that the first zone player is configured to coordinate with at least the second zone player to output media in synchrony with output of media by at least the second zone player.

2. The computing device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the one or more processors, cause the computing device to perform functions comprising:

while the first zone player is configured to coordinate with at least the second zone player to play back media in synchrony with at least the second zone player, receiving a fourth request to invoke the second zone scene; and

based on the fourth request, causing the first zone player to (a) cease to operate in accordance with the first predefined grouping of zone players such that the first zone player is no longer configured to coordinate with at least the second zone player to output media in synchrony with output of media by at least the second zone player and (b) begin to operate in accordance with the second predefined grouping of zone players such that the first zone player is configured to coordinate with at least the third zone player to output media in synchrony with output of media by at least the third zone player.

3. The computing device of claim 1, wherein causing storage of the first zone scene comprises causing storage of the first zone scene at a location other than the computing device, and wherein causing storage of the second zone scene comprises causing storage of the second zone scene at the location other than the computing device.

4. The computing device of claim 3, wherein the location other than the computing device comprises a zone player of the first predefined grouping of zone players.

5. The computing device of claim 1, wherein the first zone scene further comprises an indication of predetermined media to be played when the first zone scene is invoked, and wherein the computing device further comprises program instructions stored on the non-transitory computer-readable medium that, when executed by the one or more processors, cause the computing device to perform functions comprising:

based on the third request, causing the first zone player to coordinate with at least the second zone player to output the predetermined media in synchrony with output of the predetermined media by at least the second zone player.

6. The computing device of claim 1, wherein the first predefined grouping of zone players does not include the third zone player, and wherein the second predefined grouping of zone players does not include the second zone player.

7. The computing device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the one or more processors, cause the computing device to perform functions comprising:

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before displaying the representation of the first zone scene and the representation of the second zone scene, receiving, from another device over a data network, data defining the first zone scene and data defining the second zone scene.

8. The computing device of claim 1, wherein receiving the first request comprises receiving a first set of one or more inputs via a user interface of the computing device, wherein receiving the second request comprises receiving a second set of one or more inputs via the user interface, and wherein receiving the third request comprises receiving a third set of one or more inputs via the user interface.

9. A non-transitory computer-readable medium, wherein the non-transitory computer-readable medium is provisioned with program instructions that are executable to cause a computing device to perform functions comprising:

while serving as a controller for a networked media playback system comprising a first zone player and at least two other zone players, wherein the first zone player is operating in a standalone mode in which the first zone player is configured to play back media individually:

receiving a first request to create a first zone scene comprising a first predefined grouping of zone players including at least the first zone player and a second zone player that are to be configured for synchronous playback of media when the first zone scene is invoked; based on the first request, i) causing creation of the first zone scene, ii) causing an indication of the first zone scene to be transmitted to the first zone player, and iii) causing storage of the first zone scene;

receiving a second request to create a second zone scene comprising a second predefined grouping of zone players including at least the first zone player and a third zone player that are to be configured for synchronous playback of media when the second zone scene is invoked, wherein the third zone player is different than the second zone player;

based on the second request, i) causing creation of the second zone scene, ii) causing an indication of the second zone scene to be transmitted to the first zone player, and iii) causing storage of the second zone scene;

displaying a representation of the first zone scene and a representation of the second zone scene; and

while displaying the representation of the first zone scene and the representation of the second zone scene, receiving a third request to invoke the first zone scene; and based on the third request, causing the first zone player to transition from operating in the standalone mode to operating in accordance with the first predefined grouping of zone players such that the first zone player is configured to coordinate with at least the second zone player to output media in synchrony with output of media by at least the second zone player.

10. The non-transitory computer-readable medium of claim 9, wherein the non-transitory computer-readable medium is also provisioned with program instructions stored on the non-transitory computer-readable medium that, when executed by the one or more processors, cause the computing device to perform functions comprising:

while the first zone player is configured to coordinate with at least the second zone player to play back media in synchrony with at least the second zone player, receiving a fourth request to invoke the second zone scene; and

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based on the fourth request, causing the first zone player to (a) cease to operate in accordance with the first predefined grouping of zone players such that the first zone player is no longer configured to coordinate with at least the second zone player to output media in synchrony with output of media by at least the second zone player and (b) begin to operate in accordance with the second predefined grouping of zone players such that the first zone player is configured to coordinate with at least the third zone player to output media in synchrony with output of media by at least the third zone player.

11. The non-transitory computer-readable medium of claim 9, wherein causing storage of the first zone scene comprises causing storage of the first zone scene at a location other than the computing device, and wherein causing storage of the second zone scene comprises causing storage of the second zone scene at the location other than the computing device.

12. The non-transitory computer-readable medium of claim 11, wherein the location other than the computing device comprises a zone player of the first predefined grouping of zone players.

13. The non-transitory computer-readable medium of claim 9, wherein the first zone scene further comprises an indication of predetermined media to be played when the first zone scene is invoked, and wherein the non-transitory computer-readable medium is also provisioned with program instructions stored on the non-transitory computer-readable medium that, when executed by the one or more processors, cause the computing device to perform functions comprising:

based on the third request, causing the first zone player to coordinate with at least the second zone player to output the predetermined media in synchrony with output of the predetermined media by at least the second zone player.

14. The non-transitory computer-readable medium of claim 9, wherein the first predefined grouping of zone players does not include the third zone player, and wherein the second predefined grouping of zone players does not include the second zone player.

15. The non-transitory computer-readable medium of claim 9, wherein the non-transitory computer-readable medium further comprises program instructions stored on the non-transitory computer-readable medium that, when executed by the one or more processors, cause the computing device to perform functions comprising:

before displaying the representation of the first zone scene and the representation of the second zone scene, receiving, from another device over a data network, data defining the first zone scene and data defining the second zone scene.

16. The non-transitory computer-readable medium of claim 9, wherein receiving the first request comprises receiving a first set of one or more inputs via a user interface of the computing device, wherein receiving the second request comprises receiving a second set of one or more inputs via the user interface, and wherein receiving the third request comprises receiving a third set of one or more inputs via the user interface.

17. A method executed by a computing device, the method comprising:

while serving as a controller for a networked media playback system comprising a first zone player and at least two other zone players, wherein the first zone

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player is operating in a standalone mode in which the first zone player is configured to play back media individually;

receiving a first request to create a first zone scene comprising a first predefined grouping of zone players including at least the first zone player and a second zone player that are to be configured for synchronous playback of media when the first zone scene is invoked; based on the first request, i) causing creation of the first zone scene, ii) causing an indication of the first zone scene to be transmitted to the first zone player, and iii) causing storage of the first zone scene;

receiving a second request to create a second zone scene comprising a second predefined grouping of zone players including at least the first zone player and a third zone player that are to be configured for synchronous playback of media when the second zone scene is invoked, wherein the third zone player is different than the second zone player;

based on the second request, i) causing creation of the second zone scene, ii) causing an indication of the second zone scene to be transmitted to the first zone player, and iii) causing storage of the second zone scene;

displaying a representation of the first zone scene and a representation of the second zone scene; and while displaying the representation of the first zone scene and the representation of the second zone scene, receiving a third request to invoke the first zone scene; and based on the third request, causing the first zone player to transition from operating in the standalone mode to operating in accordance with the first predefined group-

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ing of zone players such that the first zone player is configured to coordinate with at least the second zone player to output media in synchrony with output of media by at least the second zone player.

**18.** The method of claim **17**, further comprising: while the first zone player is configured to coordinate with at least the second zone player to play back media in synchrony with at least the second zone player, receiving a fourth request to invoke the second zone scene; and

based on the fourth request, causing the first zone player to (a) cease to operate in accordance with the first predefined grouping of zone players such that the first zone player is no longer configured to coordinate with at least the second zone player to output media in synchrony with output of media by at least the second zone player and (b) begin to operate in accordance with the second predefined grouping of zone players such that the first zone player is configured to coordinate with at least the third zone player to output media in synchrony with output of media by at least the third zone player.

**19.** The method of claim **17**, wherein causing storage of the first zone scene comprises causing storage of the first zone scene at a location other than the computing device, wherein causing storage of the second zone scene comprises causing storage of the second zone scene at the location other than the computing device.

**20.** The method of claim **19**, wherein the location other than the computing device comprises a zone player of the first predefined grouping of zone players.

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